FOUNDATION ENGINEERING (GR18A3066)

III- B.Tech – II Semester

(AY 2021-22)

Dr. C. Lavanya

Professor

Department of Civil Engineering

Gokaraju Rangaraju Institute of Engineering and Technology

Bachupally, Kukatpally, Hyderabad – 500 090.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

Foundation Engineering

Course File Check List

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GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
III B.Tech (Civil Engineering) II Semester

FOUNDATION ENGINEERING

Course Code: GR18A3066 **III Year II Sem** **L:3 T:0 P:0 C:3**

UNIT I

Soil Exploration: Introduction, methods of site exploration and soil investigation, methods of boring, soil samplers, sampling procedures, penetrometer tests, analysis of borehole logs, preparation of soil investigation report.

UNIIT II

Stability of Slopes: Introduction, types of slopes and their failure mechanisms, factor of safety, analysis of finite and infinite slopes, stability analysis by standard method of slices, Taylor's stability Number. Stability of earth dam slopes under different conditions.

UNIT III

Earth pressure and retaining walls: Introduction, Rankine's theory of earth pressure, active and passive earth pressures, Coulomb's earth pressure theory, Culmann's graphical method, types of retaining walls, stability of cantilever retaining walls.

UNIT IV

Bearing capacity and settlement analysis of shallow foundations: Types and choice of foundation, location of depth, modes of soil failure, safe bearing capacity by Terzaghi, Meyerhof, Skempton and IS Methods. Effect of water table on bearing capacity, safe bearing pressure based on N value, settlement analysis, contact pressure, settlement from plate load test, and settlement from penetration tests.

UNIT V

Deep foundations: Types of piles, static pile formulae, dynamic pile formulae, pile load tests, load carrying capacity of pile groups in sands and clays, negative skin friction, types and different shapes of well foundations, components of well foundations.

TEXT BOOKS

1. Gopal Ranjan and ASR Rao, Basic and Applied Soil Mechanics, New Age International Pvt. Ltd, New Delhi, 2nd edition (2000), Reprint (2014).
2. Braja M. Das, Principles of Foundation Engineering, Cengage Learning, New Delhi, 6 th edition (2007), Reprint (2012).
3. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Soil Mechanics and Foundations,Laxmi publications Pvt. Ltd., New Delhi, 16th edition, Reprint (2012).

REFERENCES

1. VNS Murthy, Soil Mechanics and Foundation Engineering, CBS Publsihers and Distributors.
2. Bowles, J.E., Foundation Analysis and Design, McGraw-Hill Publishing Company, Newyork, 5th edition (1997).
3. A. Singh, Modern Geotechnical Engineering, 3rd Ed., CBS Publishers, New Delhi, 1999.
4. N. Som, Theory and Practice of Foundation Design, Prentice Hall, New Delhi, 2003.

.**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**
DEPARTMENT OF CIVIL ENGINEERING

Time Table

III YEAR II Sem A & B SECTION **AY 2021-22**

Day/Time	09:00-09:55	09:55-10:50	10:50-11:45	11:45-12:25	12:25-01:15	01:15-02:05	02:05-02:55
Monday	FE (B)			Lunch Break			
Tuesday		FE (B)					
Wednesday		FE (A)			FE (B)		
Thursday	FE (A)						
Friday	FE (A)		FE (B)				
Saturday							

Program Educational Objectives

1. Graduates of the programme will be successful in technical and professional career.
2. Graduates of the programme will have proficiency in solving real time Civil Engineering projects.
3. Graduates of the programme will continue to engage in life-long learning with ethical and social responsibility.

Program Outcomes

Graduates of the Civil Engineering programme will be able to

a. apply knowledge of mathematics, science and fundamentals of Civil Engineering.
b. analyse problem and interpret the data.
c. design a system component, or process to meet desired needs in Civil Engineering within realistic constraints.
d. identify, formulate, analyse and interpret data to solve Civil Engineering problems.
e. use modern engineering tools such as CAD and GIS for the Civil Engineering practice.
f. understand the impact of engineering solutions in a global, economic and societal context.
g. understand the effect of Civil Engineering solutions on environment and to demonstrate the need for sustainable development.
h. understanding of professional and ethical responsibility.
i. work effectively as an individual or in a team and to function on multi-disciplinary context.
j. communicate effectively with engineering community and society.
k. demonstrate the management principles in Civil Engineering projects.
l. recognize the need for and an ability to engage in life-long learning.

Program Specific Outcomes

1. Recognize the need for a sustainable environment and design smart infrastructure considering the global challenges.
2. Create and develop innovative designs with new era materials through research and development.

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090.

COURSE OBJECTIVES

Academic **Y**ear : 2021-22

Semester : II

Name of the Program: B.Tech Civil Engineering Year: III Section: A & B

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya / Ms. T. Jahnavi

Designation: Professor / Assistant Professor Dept.: Civil Engineering

On completion of this Subject/Course the student shall be able to:

S. No	Course Objectives
1	Learn about various soil exploration methods.
2	Estimate the factors of safety against slope stability.
3	Utilize the knowledge of earth pressure theories and retaining walls.
4	Interpret and analyze bearing capacity of shallow foundations.
5	Analyze bearing capacity deep foundations.

Signature of HOD Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090.

COURSE OUTCOMES

Academic **Y**ear : 2021-22

Semester : II

Name of the Program: B.Tech Civil Engineering Year: III Section: A & B

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya / Ms. T. Jahnavi

Designation: Professor / Assistant Professor Dept.: Civil Engineering

After completion of this course, students will be able to:

S. No	Course Outcomes
1.	Identify the various soil exploration techniques and interpret the resulting soil profiles.
2.	Assess the stability of slopes.
3.	Compute earth pressures and stability of retaining walls.
4.	Apply bearing capacity equations for shallow foundations and analyze settlement.
5.	Estimate pile and pile group capacity for soils and recognize the shapes and components of well foundations.

Signature of HOD Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Nizampet Road, Kukatpally, Hyderabad-500009

B.Tech CIVIL Engg. III Yr-II Sem- Section A- (GR18) 2021 -22

S.No	Reg No	Student Name
1	18241A0151	SOHEB PATEL
2	18241A0152	SRIAM SHIVA ADITYA
3	19241A0101	RUHAIL AHMAD LONE
4	19241A0102	AITHA SAI TEJA
5	19241A0103	BARISETTY SHIVA KARTHIK
6	19241A0104	BENDHI VARUN THEJA GOUD
7	19241A0105	BHUKYA VAMSHI
8	19241A0106	BOGE VENKAT ROHITH
9	19241A0107	BONTHA PRANEETHKUMAR
10	19241A0108	CHILUKA RAHUL
11	19241A0109	DANDI KIRAN
12	19241A0110	DAYYA RAGNESH
13	19241A0111	E MANISH GOUD
14	19241A0112	ERRAM SAI PRIYA
15	19241A0113	G DEEPIKA
16	19241A0114	GORANTALA SAI
17	19241A0115	GUGULOTHU SANTHOSH
18	19241A0116	GURIJALA SAI KUMAR
19	19241A0117	GURUJALA SRIDHAR
20	19241A0118	IRUVANTI HEMANTH KUMAR
21	19241A0119	JANGITI VYSHNAVI
22	19241A0120	JARUPLA CHERAN
23	19241A0122	JETTI SREEVANI
24	19241A0123	K SOWMYA
25	19241A0124	KADALI KRISHNASRI SAI
26	19241A0125	KAMAREDDY AKSHAY
27	19241A0126	KATTA SAI KUMAR
28	19241A0127	KOLLURI.TEJASWI
29	19241A0128	KONDAPURAM SRIJA
30	19241A0129	KOTTE VIVEK
31	19241A0130	KRUTHIKA VIJAY PALANGE
32	19241A0131	MADA AKHIL REDDY
33	19241A0132	MADARAM SHRAVAN KUMAR REDDY
34	19241A0133	MADDIGATLA AJAY SAGAR
35	19241A0134	CHANDANA MALPATEL
36	19241A0135	MANDALA CHINNI
37	19241A0136	MIREGILLA VIJAYAKUMAR

38	19241A0137	MOHD OBAID KASHIF
39	19241A0138	NARAPAKA MADHAV KUMAR
40	19241A0139	NIMMALA ARSHITHA
41	19241A0141	P SIDDARTHA
42	19241A0142	PAGIDIPALLY AJAY KUMAR
43	19241A0143	PALLAPU NAVEEN
44	19241A0144	PALLE SANATH KUMAR
45	19241A0145	PANTANGI PRANAY
46	19241A0146	PATIL SWAPNIL
47	19241A0147	POLISETTY SAAHAS
48	19241A0148	S.SAITEJA
49	19241A0149	SAI NEERAJ M
50	19241A0150	SATYA SAI PRASANNA REDDY SOLIPETA
51	19241A0151	SHAIK BILAL
52	19241A0152	SHAIK FIRDOUS AYESHA
53	19241A0153	SOORA VIKAS
54	19241A0154	TELLAM SRI SAI PAVANA ROSHINI
55	19241A0155	THALLAPALLY SWARANYA
56	19241A0156	THUMATI VENKATA VAYUNANDHAN
57	19241A0157	UDUMULA NIKHIL REDDY
58	19241A0158	VELISHALA GAYATHRI
59	19241A0159	VENKATA SIDDHARTHA RAJU VEGESNA
60	19241A0160	YASWANTH KURUVA

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B.Tech CIVIL Engg. III Yr-II Sem- Section B- (GR18) 2021 -22

S.No	Reg No	Student Name
1	19241A0161	ABDUL RAHEEM
2	19241A0162	ANEMONI MURALI MANOHAR
3	19241A0163	ASKANY HARISH SAGAR
4	19241A0164	BODLA AKSHITH
5	19241A0165	BURRA VAMSHI KRISHNA
6	19241A0166	CHERLAKOLA AKHILA
7	19241A0167	CHINTAPALLI VIKRAM
8	19241A0168	CHIRRIBOYINA DHANYA
9	19241A0169	D SREE MADHURI
10	19241A0170	GADDAM SAHITHI
11	19241A0171	GAJJALA SUKENDHAR REDDY
12	19241A0172	YASHASWI GANGAVARAM
13	19241A0173	GINDHAM ADITYA KUMAR
14	19241A0174	GUDHETI NARENDAR REDDY
15	19241A0175	GUMMADI SAI PRATEEK REDDY
16	19241A0176	HANMAPUR DHEERAJ GOUD
17	19241A0177	JAVVAJI AISHWARYA
18	19241A0178	JULAPALLY NITHIN RAO
19	19241A0179	K NAVEEN
20	19241A0180	K RAJESHWARI
21	19241A0181	KACHAVA SURENDAR
22	19241A0182	KODATHALA INDU
23	19241A0183	KOTARU SRINIVASA VARAPRASAD
24	19241A0184	MALOTH RAHUL
25	19241A0185	MATURI SATHVIK
26	19241A0186	MD ABDUL MAAJID
27	19241A0187	MEDARI DAYANA
28	19241A0188	NARSINGA SANDEEP
29	19241A0189	PALANATI ROHITH
30	19241A0190	PURALASETTY BHAVANA
31	19241A0191	RODDA MALAVIKA REDDY
32	19241A0192	SAPRAM NAGA SRILOWKYA MUKTHA
33	19241A0193	SHAIK PARVEZ ANSARI
34	19241A0194	SIDDELA THARUN KUMAR
35	19241A0195	TALARI CHANDANA SREE
36	19241A0196	VALLEPU KALYAN
37	19241A0197	VRASHAB PATEL

38	19241A0198	YELLAVULA NARENDER
39	19241A0199	BADDELA SAI THARUN
40	20245A0101	AAMANCHI BOWMI
41	20245A0102	AVIRABOINA SAI CHAITHANYA
42	20245A0103	BAIRY B S ANIRUDH
43	20245A0104	DADDU TEJASREE
44	20245A0105	DOPATHI RAVITEJA
45	20245A0106	ERUVENTI NIHARIKA
46	20245A0107	GADDAMIDI AANIL
47	20245A0108	GANDLA RISHIK RAJ
48	20245A0109	GONE NAVEEN KUMAR
49	20245A0110	KOTA VISHAL
50	20245A0111	KUMMARI MAHESH
51	20245A0112	LAKAVATH ANIL
52	20245A0113	MADAVARAM ROHITH
53	20245A0114	MANDALA AKSHITHA
54	20245A0115	M MANJUNATH
55	20245A0116	PORANDLA NAGABHUSHANAM
56	20245A0117	PULISHETTY BHAVANI
57	20245A0118	RACHA KRANTHI RANADEER
58	20245A0119	S MANOJ KUMAR
59	20245A0120	SAMUDRALA MANIDEEP
60	20245A0121	SANGEPAGA GOUTHAM
61	20245A0122	SODADASI RAHUL
62	20245A0123	VANGA HARSHITH
63	20245A0124	CHOLETI VINEETHA
64	20245A0125	GANGULA GRISHMA
65	20245A0126	BOLLAMPALLI SAI POOJITH
66	20245A0127	PAMULAPATI SUMANTH
67	20245A0128	T SANGHAMITHRA
68	20245A0129	ABEDA AKANKSHA
69	20245A0130	DOPPALAPUDI RAMVINEETH SAI
70	20245A0131	PILLY UDAY KIRAN

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

COURSE SCHEDULE

Academic **Y**ear : 2021-22

Semester : II

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya

Designation: Professor Dept.: Civil Engineering

The Schedule for the whole Course / Subject is:

Unit. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	Soil Exploration	19-01-2022	03-02-2022	9
2.	Earth slope stability	03-02-2022	18-02-2022	11
3.	Earth pressure and retaining walls	18-02-2022	04-03-2022	11
4.	Bearing capacity and settlement analysis of shallow foundations	09-03-2022	13-04-2022	17
5.	Deep foundations	20-04-2022	11-05-2022	14

Total No. of Instructional periods available for the course: 62 Hours / Periods

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

COURSE SCHEDULE

Academic **Y**ear : 2021-22

Semester : II

Name of the Program: B.Tech Civil Engineering Year: III Section: B

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Ms. T. Jahnavi

Designation: Assistant Professor Dept.: Civil Engineering

The Schedule for the whole Course / Subject is:

Unit. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	Soil Exploration	17-01-2022	03-02-2022	9
2.	Earth slope stability	04-02-2022	18-02-2022	11
3.	Earth pressure and retaining walls	21-02-2022	08-03-2022	11
4.	Bearing capacity and settlement analysis of shallow foundations	09-03-2022	04-04-2022	17
5.	Deep foundations	05-04-2022	10-05-2022	14

Total No. of Instructional periods available for the course: 62 Hours / Periods

Signature of HOD Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090.

SCHEDULE OF INSTRUCTIONS

COURSE PLAN

Academic **Y**ear : 2021-22

Semester : II

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya

Designation: Professor Dept.: Civil Engineering

Lesson No.	Unit No.	Date	No. of Periods	Topics	Course Objectives & Outcomes	Blooms Taxonomy	References Text Book Page No.
1	I	19-01-2022	1	Introduction	Cob -1, CO-1	K1	655
2		20-01-2022	1	Soil exploration, methods	Cob -1, CO-1	K1	655
3		20-01-2022	1	Boring Methods	Cob -1, CO-1	K2	655
4		21-01-2022	1	Soil sampling methods, Field tests	Cob -1, CO-1	K2	655
5		21-01-2022	1	Penetration Tests	Cob -1, CO-1	K3	656
6		28-01-2022	1	Menard Pressure meter test	Cob -1, CO-1	K3	659
7		28-01-2022	1	Plate load test	Cob -1, CO-1	K3	666
8		02-02-2022	1	Borehole logs	Cob -1, CO-1	K3	666
9		03-02-2022	1	Planning and preparation of investigation report	Cob -1, CO-1	K3	673
10	II	03-02-2022	1	Earth Slope Stability	Cob -2, CO-2	K1	346
11		04-02-2022	1	Types of failures	Cob -2, CO-2	K1	346

12		04-02-2022	1	Infinite earth slopes	Cob -2, CO-2	K2	347
13		09-02-2022	1	Finite earth slopes	Cob -2, CO-2	K2	351
14		10-02-2022	1	Stability analysis by standard method of slices	Cob -2, CO-2	K2	347
15		10-02-2022	1	Total stress analysis	Cob -2, CO-2	K2	355
16		11-02-2022	1	Effective stress method of analysis	Cob -2, CO-2	K2	355
17		11-02-2022	1	Taylor's Stability Number	Cob -2, CO-2	K3	352
18		17-02-2022	1	Stability of earth dam slopes under different conditions	Cob -2, CO-2	K3	362
19		17-02-2022	1	Problems on stability analysis	Cob -2, CO-2	K4	357
20		18-02-2022	1	Problems on various methods	Cob -2, CO-2	K4	372
21	III	18-02-2022	1	Earth Pressures	Cob -3, CO-3	K2	384
22		23-02-2022	1	Earth pressure at rest	Cob -3, CO-3	K2	384
23		24-02-2022	1	Rankine's theory of earth pressure - Active	Cob -3, CO-3	K3	386
24		24-02-2022	1	Rankine's theory of earth pressure - Passive	Cob -3, CO-3	K3	386
25		25-02-2022	1	Coulomb's earth pressure theory	Cob -3, CO-3	K3	388
26		25-02-2022	1	Culmann's graphical method	Cob -3, CO-3	K3	388
27		02-03-2022	1	Types of retaining walls	Cob -3, CO-3	K1	388
28		03-03-2022	1	Stability of cantilever retaining walls	Cob -3, CO-3	K3	397
29		03-03-2022	1	Problems on earth pressures	Cob -3, CO-3	K4	401
30		04-03-2022	1	Problems on earth pressures	Cob -3, CO-3	K4	413
31		04-03-2022	1	Problems on earth pressures	Cob -3, CO-3	K4	413
32	IV	09-03-2022	1	Shallow Foundations	Cob -4 CO-4	K2	464
33		10-03-2022	1	Types of Shallow Foundations	Cob -4 CO-4	K2	464
34		10-03-2022	1	Location	Cob -4 CO-4	K2	464
35		11-03-2022	1	Depth of foundation	Cob -4 CO-4	K2	464
36		11-03-2022	1	Modes of soil failure	Cob -4	K2	465

					CO-4		
37		23-03-2022	1	Terzaghi's Method	Cob -4 CO-4	K3	466
38		24-03-2022	1	Meyerhoff's Method	Cob -4 CO-4	K3	472
39		24-03-2022	1	Skempton Method	Cob -4 CO-4	K3	468
40		25-03-2022	1	IS Method	Cob -4 CO-4	K3	473
41		25-03-2022	1	Effect of water table	Cob -4 CO-4	K2	480
42		30-03-2022	1	N Value	Cob -4 CO-4	K2	480
43		06-04-2022	1	Settlement analysis from plate load test	Cob -4 CO-4	K2	479
44		07-04-2022	1	Settlement analysis from penetration tests	Cob -4 CO-4	K2	485
45		07-04-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	478
46		08-04-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	486
47		08-04-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	478
48		13-04-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	486
49	V	20-04-2022	1	Pile Foundations	Cob -5 CO-5	K1	535
50		21-04-2022	1	Need of pile foundation	Cob -5 CO-5	K1	535
51		21-04-2022	1	Types of pile foundation	Cob -5 CO-5	K1	535
52		22-04-2022	1	Static pile formulae	Cob -5 CO-5	K3	535
53		22-04-2022	1	Dynamic pile formulae	Cob -5 CO-5	K2	536
54		27-04-2022	1	Pile load tests	Cob -5 CO-5	K2	546
55		28-04-2022	1	Pile groups in sands	Cob -5 CO-5	K2	546
56		29-04-2022	1	Pile groups in clays	Cob -5 CO-5	K2	546
57		04-05-2022	1	Settlement of pile groups	Cob -5 CO-5	K2	559
58		05-05-2022	1	Negative skin friction	Cob -5 CO-5	K2	559
59		05-05-2022	1	Types and shapes of well foundations	Cob -5 CO-5	K3	554
60		06-05-2022	1	Components of well foundations	Cob -5 CO-5	K2	568
61		06-05-2022	1	Problems	Cob -5	K4	567

					CO-5		
62		11-05-2022	1	Problems	Cob -5 CO-5	K4	570

Signature of HOD

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

SCHEDULE OF INSTRUCTIONS

COURSE PLAN

Academic **Y**ear : 2020-21

Semester : II

Name of the Program: B.Tech Civil Engineering Year: III Section: B

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Ms. T. Jahnavi

Designation: Assistant Professor Dept.: Civil Engineering

Lesson No.	Unit No.	Date	No. of Periods	Topics	Course Objectives & Outcomes	Blooms Taxonomy	References Text Book Page No.
1	I	17-01-2022	1	Introduction	Cob -1, CO-1	K1	655
2		19-01-2022	1	Soil exploration, methods	Cob -1, CO-1	K1	655
3		20-01-2022	1	Boring Methods	Cob -1, CO-1	K2	655
4		21-01-2022	1	Soil sampling methods, Field tests	Cob -1, CO-1	K2	655
5		27-01-2022	1	Penetration Tests	Cob -1, CO-1	K3	656
6		28-01-2022	1	Menard Pressure meter test	Cob -1, CO-1	K3	659
7		28-01-2022	1	Plate load test	Cob -1, CO-1	K3	666
8		02-02-2022	1	Borehole logs	Cob -1, CO-1	K3	666
9		03-02-2022	1	Planning and preparation of investigation report	Cob -1, CO-1	K3	673
10	II	04-02-2022	1	Earth Slope Stability	Cob -2,	K1	346

					CO-2		
11		07-02-2022	1	Types of failures	Cob -2, CO-2	K1	346
12		08-02-2022	1	Infinite earth slopes	Cob -2, CO-2	K2	347
13		08-02-2022	1	Finite earth slopes	Cob -2, CO-2	K2	351
14		09-02-2022	1	Stability analysis by standard method of slices	Cob -2, CO-2	K2	347
15		11-02-2022	1	Total stress analysis	Cob -2, CO-2	K2	355
16		14-02-2022	1	Effective stress method of analysis	Cob -2, CO-2	K2	355
17		15-02-2022	1	Taylor's Stability Number	Cob -2, CO-2	K3	352
18		15-02-2022	1	Stability of earth dam slopes under different conditions	Cob -2, CO-2	K3	362
19		16-02-2022	1	Problems on stability analysis	Cob -2, CO-2	K4	357
20		18-02-2022	1	Problems on various methods	Cob -2, CO-2	K4	372
21	III	21-02-2022	1	Earth Pressures	Cob -3, CO-3	K2	384
22		22-02-2022	1	Earth pressure at rest	Cob -3, CO-3	K2	384
23		22-02-2022	1	Rankine's theory of earth pressure - Active	Cob -3, CO-3	K3	386
24		23-02-2022	1	Rankine's theory of earth pressure - Passive	Cob -3, CO-3	K3	386
25		25-02-2022	1	Coulomb's earth pressure theory	Cob -3, CO-3	K3	388
26		28-02-2022	1	Culmann's graphical method	Cob -3, CO-3	K3	388
27		02-03-2022	1	Types of retaining walls	Cob -3, CO-3	K1	388
28		04-03-2022	1	Stability of cantilever retaining walls	Cob -3, CO-3	K3	397
29		07-03-2022	1	Problems on earth pressures	Cob -3, CO-3	K4	401
30		08-03-2022	1	Problems on earth pressures	Cob -3, CO-3	K4	413
31		08-03-2022	1	Problems on earth pressures	Cob -3, CO-3	K4	413
32	IV	09-03-2022	1	Shallow Foundations	Cob -4 CO-4	K2	464
33		11-03-2022	1	Types of Shallow	Cob -4	K2	464

				Foundations	CO-4		
34		14-03-2022	1	Location	Cob -4 CO-4	K2	464
35		15-03-2022	1	Depth of foundation	Cob -4 CO-4	K2	464
36		15-03-2022	1	Modes of soil failure	Cob -4 CO-4	K2	465
37		16-03-2022	1	Terzaghi's Method	Cob -4 CO-4	K3	466
38		18-03-2022	1	Meyerhoff's Method	Cob -4 CO-4	K3	472
39		21-03-2022	1	Skempton Method	Cob -4 CO-4	K3	468
40		22-03-2022	1	IS Method	Cob -4 CO-4	K3	473
41		22-03-2022	1	Effect of water table	Cob -4 CO-4	K2	480
42		23-03-2022	1	N Value	Cob -4 CO-4	K2	480
43		25-03-2022	1	Settlement analysis from plate load test	Cob -4 CO-4	K2	479
44		28-03-2022	1	Settlement analysis from penetration tests	Cob -4 CO-4	K2	485
45		29-03-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	478
46		29-03-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	486
47		30-03-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	478
48		04-04-2022	1	Problems on bearing capacity	Cob -4 CO-4	K4	486
49	V	05-04-2022	1	Pile Foundations	Cob -5 CO-5	K1	535
50		06-04-2022	1	Need of pile foundation	Cob -5 CO-5	K1	535
51		11-04-2022	1	Types of pile foundation	Cob -5 CO-5	K1	535
52		12-04-2022	1	Static pile formulae	Cob -5 CO-5	K3	535
53		13-04-2022	1	Dynamic pile formulae	Cob -5 CO-5	K2	536
54		14-04-2022	1	Pile load tests	Cob -5 CO-5	K2	546
55		18-04-2022	1	Pile groups in sands	Cob -5 CO-5	K2	546
56		26-04-2022	1	Pile groups in clays	Cob -5 CO-5	K2	546

57		28-04-2022	1	Settlement of pile groups	Cob -5 CO-5	K2	559
58		04-05-2022	1	Negative skin friction	Cob -5 CO-5	K2	559
59		06-05-2022	1	Types and shapes of well foundations	Cob -5 CO-5	K3	554
60		09-05-2022	1	Components of well foundations	Cob -5 CO-5	K2	568
61		10-05-2022	1	Problems	Cob -5 CO-5	K4	567
62		10-05-2022	1	Problems	Cob -5 CO-5	K4	570

Signature of HOD

Signature of faculty

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 1 Duration of Lesson: 1hr

Lesson Title: Introduction

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Explain the importance of soil exploration for safe and economical design of substructures
2. Identify different methods of soil exploration and borings
3. List the different types of in-situ tests.

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

- Knowledge of sub-soil conditions
- Soil Investigation
- Borings, sampling, Field tests for soil exploration.

Assignment / Questions:

- What is the need for soil exploration for effective design of foundations? (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 2 Duration of Lesson: 1hr

Lesson Title: Soil Exploration

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify different methods of soil exploration and borings
2. Identify different methods of soil exploration
3. Differentiate between Preliminary exploration and detailed investigation

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

- Knowledge of sub-soil conditions
- Soil Investigation
- Borings, sampling, Field tests for soil exploration.

Assignment / Questions:

- What are the types of soil exploration for effective design of foundations? (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 3 Duration of Lesson: 1hr

Lesson Title: Boring Methods

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Infer different types of boring techniques.

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

- Auger boring, Wash boring, Percussion boring, Rotary boring

Assignment / Questions:

- Discuss about various boring methods with the help of neat sketch.
  (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 4 Duration of Lesson: 1hr

Lesson Title: Soil Sampling Methods

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify different methods of soil sampling

2. List the different type's samplers

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

- Inside clearance , Outside clearance, Area Ratio
- Open Drive Sampler, Piston Sampler, Rotary Sampler

Assignment / Questions:

- Explain about disturbed sample, undisturbed sample, and representative sample? (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 5 Duration of Lesson: 1hr

Lesson Title: Penetration Tests

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Interpret the subsoil conditions based on penetration tests

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

- Standard penetration test, Cone penetration test

Assignment / Questions:

- What are the different corrections that have to be applied for SPT N value? (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 6 Duration of Lesson: 1hr

Lesson Title: Pressure meter

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Explain the importance of Pressure meter

2. Summarize the procedure of PLT and Pressure meter tests

3. List the different types of PMT's

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

Plate Load Test, method, applicability

- Components of PMT
- Menard type PMT

Assignment / Questions:

- Explain the test procedure of Pressure meter Test? (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 7 Duration of Lesson: 1hr

Lesson Title: Plate load test

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Explain Plate load test

2. Summarize the limitations.

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

- Plate Load Test,
- Method and applicability

Assignment / Questions:

- Explain the test procedure of Plate Load Test? (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 8 Duration of Lesson: 1hr

Lesson Title: Borehole logs

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Discuss the importance of soil investigation.

2. Identify different methods of bore hole logging.

3. Illustrate various geophysical investigation techniques.

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

Knowledge of sub-soil conditions

- Borings and sampling
- Geophysical methods

Assignment / Questions:

- Discuss various bore logging and geophysical techniques used for soil investigation. (Cob -1, CO-1)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 9 Duration of Lesson: 1hr

Lesson Title: Planning and preparation of investigation report

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify the importance of soil report.
2. Discuss the steps involved in preparing soil report.

TEACHING AIDS : White Board, Marker
TEACHING POINTS

- Preliminary exploration
- Detailed investigation
- Soil report

Assignment / Questions:

- Discuss the importance and various components of soil investigation report. (Cob -1, CO-1)

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TUTORIAL SHEET - 1

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Compute the area ratio of a sampling tube given the outside diameter = 110 mm and inside diameter = 88 mm. Also compute outside Clearance and inside clearance of a sampling tube given the inside and outside diameter of cutting edge/driving shoe are 82 mm and 118 mm. comments on the result computed?

2. Describe correction for overburden pressure and dilatancy in SPT test.

Course Objectives: 1
Course Outcomes: 1

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ASSIGNMENT SHEET – 1

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Discuss with neat sketch boring methods used in soil exploration.

2. Describe the step by step procedure of "Standard Penetration Test" used in soil exploration.

Course Objectives: 1
Course Outcomes: 1

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 10 Duration of Lesson: 1hr

Lesson Title: Earth Slope Stability

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Relate different slope failure mechanisms.
2. Interpret various forces that influence slope stability
3. Explain the importance of factor of safety.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Plane strain condition
- Slip surface and slope failure
- Factor of safety

Assignment / Questions:

- What is plane strain condition? Discuss various forces that induce slope failure. (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 11 Duration of Lesson: 1hr

Lesson Title: Types of failures

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Analyse the types of various slope failures.
2. Determine the factors of safety for infinite slopes.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Types of slope failures
- Factor of safety for cohesive and cohesionless soils.

Assignment / Questions:

- Describe the procedure for evaluating the factor of safety against failure in infinite slopes. (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 12 Duration of Lesson: 1hr

Lesson Title: Infinite earth slopes

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Define infinite slopes.

2. Identify the respective force components in infinite slopes.

TEACHING AIDS : White Board, Marker, Power Point Presentation
TEACHING POINTS

- Knowledge of infinite slopes
- Force components in slopes

Assignment / Questions:

- Distinguish between finite and infinite slopes? (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 13 Duration of Lesson: 1hr

Lesson Title: Finite earth slopes

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Define finite slopes.

2. Identify the respective force components in finite slopes.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Knowledge of finite slopes
- Force components in slopes

Assignment / Questions:

- Distinguish between finite and infinite slopes? (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 14 Duration of Lesson: 1 hr

Lesson Title: Stability analysis by standard method of slices

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Explain Swedish circle procedure to find the slip surface.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Swedish circle method

Assignment / Questions:

- Describe the procedure followed to draw a Swedish circle (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 15 Duration of Lesson: 1 hr

Lesson Title: Total stress analysis

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Discuss about Total stress and effective stress method of analysis.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Total stress analysis
- Effective stress method of analysis

Assignment / Questions:

- Differentiate between total stress and effective stress method of analysis. (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 16 Duration of Lesson: 1 hr

Lesson Title: Effective stress method of analysis

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Discuss about Total stress and effective stress method of analysis.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Total stress analysis
- Effective stress method of analysis

Assignment / Questions:

- Differentiate between total stress and effective stress method of analysis. (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 17 Duration of Lesson: 1 hr

Lesson Title: Taylor's stability number.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Evaluate Taylor's stability number for a given slope.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Taylor stability number

Assignment / Questions:

- What is stability number?
  (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 18 Duration of Lesson: 1 hr

Lesson Title: Stability of earth dams under different conditions.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Illustrate various conditions of saturation in dams.
2. Differentiate various slope failure conditions in dams.
3. Solve typical slope stability problems for embankments and dams.

TEACHING AIDS : White Board, Marker.
TEACHING POINTS

- Sudden drawdown and steady seepage
- End of construction stage
- Numericals on various types of slope stability

Assignment / Questions:

- Distinguish between sudden drawdown and steady seepage conditions? (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 19 Duration of Lesson: 1 hr

Lesson Title: Stability of analysis problems by using all methods.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Solve typical slope stability problems for embankments and dams.

TEACHING AIDS : White Board, Marker.
TEACHING POINTS

- Problems on stability analysis.

Assignment / Questions:

- Solve problems on slope stability? (Cob -2, CO-2)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 20 Duration of Lesson: 1 hr

Lesson Title: Stability of analysis problems by using all methods.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Solve typical slope stability problems for embankments and dams.

TEACHING AIDS : White Board, Marker.
TEACHING POINTS

- Stability analysis of slope by Swedish arc method.
- Stability analysis of slope by Taylor's stability number.

Assignment / Questions:

- Solve problems on slope stability? (Cob -2, CO-2)
- A proposed cutting in a homogeneous cohesive soil will have a slope angle of 25^0 and will be 8 m deep. Using Taylor's stability chart, determine the factor of safety against shear failure in respect of the following soils. (a) C_u = 45 kN/sq.m; $ø_u$ = 0; γ =19 kN/sq.m; D is large.
  (b) C_u = 45 kN/sq.m; $ø_u$ = 15^0; γ =19 kN/sq.m. (Cob -2, CO-2)

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TUTORIAL SHEET - 2

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Define Finite and Infinite slopes. Explain different types of finite slope failures with neat sketch.

2. Find the critical height of an infinite slope having a slope angle of 30°. The slope is made of stiff clay having a cohesion 20 kN/m^2, angle of internal friction 20°, void ratio 0.7 and specific gravity 2.7. Consider the following cases for the analysis. (a) The soil is dry. (b) The slope is submerged.

Course Objectives: 2
Course Outcomes: 2

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ASSIGNMENT SHEET – 2

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Explain the method of slices to analyze the stability. Derive an expression for the factor of safety.

2. Explain different types of finite slope failures with neat sketch.

3. Estimate the factor of safety with respect to cohesion against failure of the canal slope of 45°, for the below two conditions. Height of the canal is 6m below the ground surface and its soil properties are c_u=15kN/m^2, $Ø_u$=15°, e=0.89 and G_s=2.7 when the canal is full of water (Take Sn=0.08) and when there is a sudden draw down (Take Sn=0.126)

Course Objectives: 2
Course Outcomes: 2

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 21 Duration of Lesson: 1 hr

Lesson Title: Earth pressure theories.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Define earth pressure and its importance in civil engineering.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Importance of Earth pressure
- Types of earth pressures.

Assignment / Questions:

- Describe different types of earth pressure? (Cob -3 CO-3)

Signature of faculty

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 22 Duration of Lesson: 1 hr

Lesson Title: Earth pressure theory at rest

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Extend the theory of earth pressure at rest condition.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- earth pressure at rest

Assignment / Questions:

- Discuss about Earth pressure at rest condition. (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 23 Duration of Lesson: 1 hr

Lesson Title: Rankine's earth pressure theory - Active

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify Rankine's theory of earth pressure.
2. Evaluate the active earth pressures.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Rankine's earth pressure theory

Assignment / Questions:

- List out the assumption & Explain Rankine's earth pressure theory? (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 24 Duration of Lesson: 1 hr

Lesson Title: Rankine's earth pressure theory - Passive

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify Rankine's theory of earth pressure.
2. Evaluate the passive earth pressures.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Rankine's earth pressure theory

Assignment / Questions:

- List out the assumption & Explain Rankine's earth pressure theory? (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 25 Duration of Lesson: 1 hr

Lesson Title: Coulomb's theory of Earth pressure.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Infer the Coulomb's theory of earth pressure.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Coulomb's earth pressure theory

Assignment / Questions:

- Explain Coulomb's procedure for evaluating earth pressures? (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 26 Duration of Lesson: 1 hr

Lesson Title: Culmann's graphical method.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Analyse earth pressures using culmann's graphical method.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Culmann's procedure for evaluating earth pressures

Assignment / Questions:

- Describe the Culmann's graphical procedure to calculate earth pressures. (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 27 Duration of Lesson: 1 hr

Lesson Title: Types of retaining walls

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify the functionality of retaining structures.
2. Differentiate between different types of retaining walls.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Retaining structures
- Types of retaining walls

Assignment / Questions:

- Describe various types of retaining walls with neat sketches (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 28 Duration of Lesson: 1 hr

Lesson Title: stability of cantilever retaining wall

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Describe the functionality of cantilever retaining structures.
2. Infer the stability considerations of cantilever retaining walls.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Stability of cantilever retaining walls

Assignment / Questions:

- Describe the cantilever retaining walls along with its stability considerations. (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 29 Duration of Lesson: 1hr

Lesson Title: problems on all theories.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Solve problems pertaining to active and passive pressure in various geotechnical structures.
2. Solve problems on earth pressure at rest.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Earth pressure at rest
- Problems.

Assignment / Questions:

- Discuss in detail about the earth pressure at rest condition. (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 30 Duration of Lesson: 1hr

Lesson Title: Problems on earth pressure theories

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Solve problems related to various earth pressure theories.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Passive earth pressure.
- Active earth pressure.
- Problems.

Assignment / Questions:

- Analyze earth pressures developed in an embankment using Rankines theory . (Cob -3 CO-3)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 31 Duration of Lesson: 1hr

Lesson Title: Problems on stability of retaining walls

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Solve problems related to retaining walls.

TEACHING AIDS : White Board, Marker, Power Point Presentation

TEACHING POINTS

- Problems on stability of cantilever retaining wall.

Assignment / Questions:

- Analyze stability of cantilever retaining walls. (Cob -3 CO-3)

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TUTORIAL SHEET - 3

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. A retaining wall with a smooth vertical back retains sand backfill for a depth of 6 m. The backfill has a horizontal surface and has the following properties. C' = 0, $\varphi = 28^{0,}$ $\gamma = 16$ kN/m^3, $\gamma_{sat} = 20$ kN/m^3. Calculate the magnitude of the total thrust against the wall for the conditions given below.

2. A retaining wall with a smooth vertical back retains sand backfill for a depth of 4.5 m. The backfill has a horizontal surface and has the following properties. C' = 0, $\varphi = 30^{0,}$ $\gamma = 18$ kN/m^3, $\gamma_{sat} = 20$ kN/m^3. Calculate the magnitude of the total thrust against the wall when the wall is free to yield if water table is at a depth of 2m with no drainage. Also, determine the point of application of the resultant thrust.

Course Objectives: 3
Course Outcomes: 3

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ASSIGNMENT SHEET – 3

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Describe active and passive conditions in Rankine's earth pressure theory against a retaining wall with a neat sketch.
2. Culmann's Graphical Method for Active Earth Pressure of Cohesionless Soil:
3. Explain about assumptions in Coulomb's theory.

Course Objectives: 3
Course Outcomes: 3

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 32 Duration of Lesson: 1hr

Lesson Title: Introduction - Shallow foundations.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify shallow foundation and its components

TEACHING AIDS : White Board, Marker
TEACHING POINTS

- Knowledge of shallow foundation
-

Assignment / Questions:

- Discuss various types of foundations. (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 33 Duration of Lesson: 1hr

Lesson Title: Introduction - Types of shallow foundations.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Illustrate the types of shallow foundations.

TEACHING AIDS : White Board, Marker
TEACHING POINTS

- Knowledge of shallow foundation
- Types of shallow foundation

Assignment / Questions:

- Discuss various types of shallow foundations with neat sketches. (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 34 Duration of Lesson: 1 hr

Lesson Title: Choice of foundation.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Choose a particular type of foundation for specific constructions.

TEACHING AIDS : White Board, Marker
TEACHING POINTS

- Depth and location of foundation

Assignment / Questions:

- What factors do you consider before selecting a particular type of foundation? (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 35 Duration of Lesson: 1 hr

Lesson Title: Location and depth of foundation.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Evaluate foundation depth for a given site condition and location.

TEACHING AIDS : White Board, Marker

TEACHING POINTS

- Depth and location of foundation

Assignment / Questions:

- What factors do you consider before selecting a particular type of foundation? (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 36 Duration of Lesson: 1 hr

Lesson Title: Modes of soil failure

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Review the importance of modes of soil failure in shallow foundations.

TEACHING AIDS : White Board, Marker, power point presentation

TEACHING POINTS

- General shear failure
- Punching shear failure
- Local shear failure

Assignment / Questions:

- Discuss about various modes of soil failure.
  (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 37 Duration of Lesson: 1 hr

Lesson Title: Terzaghis method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Infer the importance and computation of safe bearing capacity.
2. Illustrate the factors involved in Terzaghis bearing capacity analysis.
3. Calculate the safe bearing capacity using Terzaghi's method.

TEACHING AIDS : White Board, Marker, power point presentation
TEACHING POINTS

- Safe bearing capacity
- Terzaghi's analysis to evaluate safe bearing capacity
- Bearing capacity coefficients

Assignment / Questions:

- Describe the Terzaghi's theory for evaluating safe bearing capacity? (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 38 Duration of Lesson: 1hr

Lesson Title: Meyerhof's method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Illustrate the factors involved in Meyerhof's bearing capacity analysis.
2. Evaluate the safe bearing capacity using Meyerhof's method.

TEACHING AIDS : White Board, Marker, power point presentation

TEACHING POINTS

- Meyerhof's analysis to evaluate safe bearing capacity
- Bearing capacity coefficients for Meyerhof's analysis

Assignment / Questions:

- Compare the Terzaghi's and Meyerhof's theories for evaluating safe bearing capacity? (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 39 Duration of Lesson: 1 hr

Lesson Title: Skempton's bearing capacity method.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Express the factors involved in Skempton's bearing capacity analysis.
2. Evaluate the safe bearing capacity using Skempton's method.

TEACHING AIDS : White Board, Marker, power point presentation
TEACHING POINTS

- Skempton's analysis to evaluate safe bearing capacity
- Skempton's coefficients

Assignment / Questions:

- Discuss the improvements made in Skempton's bearing capacity analysis (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 40 Duration of Lesson: 1 hr

Lesson Title: Bearing capacity by IS method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Illustrate the IS method of evaluating safe bearing capacity.

TEACHING AIDS : White Board, Marker, power point presentation

TEACHING POINTS

- IS method

Assignment / Questions:

- Discuss the improvements made in IS code for bearing capacity analysis (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 41 Duration of Lesson: 1hr

Lesson Title: Effect of water table on bearing capacity

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Illustrate the importance of effect of water table.
2. Illustrate the importance of bearing pressure based on N value.

TEACHING AIDS : White Board, Marker.
TEACHING POINTS

- Types of bearing pressures and definitions.
- Effect of water table.

Assignment / Questions:

- Explain the importance of allowable bearing pressure. (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 42 Duration of Lesson: 1hr

Lesson Title: Safe bearing pressure based on 'N' Value.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Review the various types of bearing pressures.
2. Illustrate the importance of bearing pressure based on N value.

TEACHING AIDS : White Board, Marker.
TEACHING POINTS

- Types of bearing pressures and definitions.
- Allowable bearing pressures.

Assignment / Questions:

- Explain the importance of allowable bearing pressure. (Cob -4 CO-4)

Signature of faculty

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 43 Duration of Lesson: 1 hr

Lesson Title: Settlement Analysis.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Perform the settlement analysis on a given foundation and loading conditions.
2. Illustrate various allowable settlement criteria for different types of structures.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Settlement analysis
- Allowable settlements

Assignment / Questions:

- How do you perform settlement analysis on a given foundation system. (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 44 Duration of Lesson: 1 hr

Lesson Title: Settlement from plate load test and penetration tests.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Illustrate the importance of Settlement from plate load test and penetration tests.
2. Explain the procedure for conducting plate load test.
3. Analyze settlements obtained from plate load test.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Safe bearing capacity
- Plate load test
- Penetration tests

Assignment / Questions:

- Discuss the procedure for evaluating bearing capacity and settlement from plate load test. (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 45 Duration of Lesson: 1hr

Lesson Title: Problems on bearing capacity.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Perform the bearing pressure analysis using various methods.
2. Calculate the safe bearing capacity for given foundation system.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Numericals on bearing capacity methods
- Safe bearing capacity

Assignment / Questions:

- Calculate the safe bearing capacity for an ideal shallow foundation assuming the friction parameters (Cob -4 CO-4)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 46 Duration of Lesson: 1hr

Lesson Title: Problems on bearing capacity.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Perform the bearing pressure analysis using various methods.
2. Calculate the safe bearing capacity for given foundation system.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Numerical on bearing capacity methods
- Safe bearing capacity

Assignment / Questions:

- Calculate the safe bearing capacity for an ideal shallow foundation assuming the friction parameters (Cob -4 CO-4)

Signature of faculty

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 47 Duration of Lesson: 1hr

Lesson Title: Problems on bearing capacity.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Perform the bearing pressure analysis using various methods.
2. Calculate the safe bearing capacity for given foundation system.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Numerical on bearing capacity methods
- Safe bearing capacity

Assignment / Questions:

- Calculate the safe bearing capacity for an ideal shallow foundation assuming the friction parameters (Cob -4 CO-4)

Signature of faculty

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 48 Duration of Lesson: 1hr

Lesson Title: Problems on bearing capacity.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Perform the bearing pressure analysis using various methods.
2. Calculate the safe bearing capacity for given foundation system.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Numerical on bearing capacity methods
- Safe bearing capacity

Assignment / Questions:

- Calculate the safe bearing capacity for an ideal shallow foundation assuming the friction parameters (Cob -4 CO-4)

Signature of faculty

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TUTORIAL SHEET - 4

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Distinguish between Terzaghi's theory and Meyerhoff's thoery.
2. A square footing of 1.5m x 1.5m in size is located at a depth of 1m below the ground surface. The footing is subjected to an eccentric load of 500kN with an eccentricity of 0.25m along one of the symmetrical axes. Calculate the factor of safety against bearing failure. Take $c=60kN/m^2$, Ø=0°, $\gamma=20kN/m^3$, Nc=5.14, Nq=1.0, Nγ=0. Use Meyerhoff's theory.
3. Calculate the ultimate bearing capacity of a strip footing 2m wide and 1.5m deep. Also, calculate net allowable and allowable gross load assuming general shear failure condition. Take $c=16kN/m^2$, Ø=30°, $\gamma=17kN/m^3$, Nc=37.2, Nq=22.5, Nγ=19.7 and F.S=3. Use Terzaghi's theory.

Course Objectives: 4
Course Outcomes: 4

Signature of faculty

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ASSIGNMENT SHEET – 4

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Discuss about principal modes of soil failure in shallow foundations.

2. A strip footing is to carry a net safe load of 400kN/^{m2} which is located at a depth of 1.5m below the ground surface. The water table is at the ground surface. The cohesionless soil has the following properties. γ_{sat}=21kN/^{m3} and Ø = 35°. Find the width of the footing using Terzaghi's theory. Assume general shear failure condition. Take N_c=57.8, N_q=41.4, N_γ=42.4 and factor of safety = 3.0.

Course Objectives: 4
Course Outcomes: 4

Signature of faculty

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Bachupally, Kukatpally, Hyderabad – 500 090.

LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 49 Duration of Lesson: 1 hr

Lesson Title: Pile Foundations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Review the importance of deep foundations.
2. Evaluate the load carrying capacity of pile foundations and well foundations.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Pile foundation
- Well foundation
- Load carrying capacity

Assignment / Questions:

- Describe the importance of deep foundations (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 50 Duration of Lesson: 1 hr

Lesson Title: Need for pile foundation and types

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Review the importance of pile foundations.
2. Illustrate the necessity of piles.
3. Illustrate the various types of piles used.
4. Evaluate the load carrying capacity of pile foundations.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Pile foundation - definitions
- Load carrying capacity
- Necessity
- Types

Assignment / Questions:

- Discuss about necessity of pile foundations (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 51 Duration of Lesson: 1 hr

Lesson Title: Types of piles.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Review the importance of pile foundations.
2. Illustrate the various types of piles used.
3. Evaluate the load carrying capacity of pile foundations.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Pile foundation - definitions
- Classification of piles
- Load carrying capacity

Assignment / Questions:

- Describe various classifications of pile foundations (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 52 Duration of Lesson: 1hr

Lesson Title: Static pile formulae

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Evaluate the load carrying capacity of pile foundations.
2. Predict the procedure to analyse piles using static formulae.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Load carrying capacity
- Static pile formulae

Assignment / Questions:

- Discuss various static formulae available to analyse the pile foundations (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 53 Duration of Lesson: 1 hr

Lesson Title: Dynamic pile formulae

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Express the procedure to analyse piles using dynamic formulae.
2. Illustrate pile load test and its importance.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Dynamic pile formulae
- Pile load testing – procedure, advantages

Assignment / Questions:

- Discuss various dynamic formulae available to analyse the pile foundations (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 54 Duration of Lesson: 1 hr

Lesson Title: Pile load test

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Procedure for pile load test and its recommendations.
2. Illustrate pile load test and its importance.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Pile load testing
- Procedure
- types

Assignment / Questions:

- Explain the procedure to perform pile load test with all specifications. (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 55 Duration of Lesson: 1 hr

Lesson Title: Pile groups in sands

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Recognize the behavior of piles as a group.
2. Differentiate the behavior of pile groups in clays and sands.
3. Evaluate the load carrying capacity of pile groups.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Pile groups
- Behavior in sands
- Load carrying capacity in sands

Assignment / Questions:

- Discuss various methods to evaluate load carrying capacity of pile groups in sands and clays (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 56 Duration of Lesson: 1 hr

Lesson Title: Pile groups in clays.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Recognize the behavior of piles as a group.
2. Differentiate the behavior of pile groups in clays and sands.
3. Evaluate the load carrying capacity of pile groups.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Pile groups
- Behavior in clays
- Load carrying capacity in clays

Assignment / Questions:

- Discuss various methods to evaluate load carrying capacity of pile groups in sands and clays (Cob -5 CO-5)

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090.

LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 57

Duration of Lesson: 1 hr

Lesson Title: Settlement of pile groups

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Recognize the settlement behavior of piles as a group.
2. Differentiate the settlement of pile groups in clays and sands.
3. Evaluate the settlement of pile groups using numerical data.

TEACHING AIDS : White Board, Marker and power point presentation.

TEACHING POINTS

- Settlement of pile groups
- Settlement behavior in sands and clays
-

Assignment / Questions:

- Evaluate the load carrying capacity and settlement of pile groups (6 piles in a group), both in sands and clays assuming length and suitable friction parameters. (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 58

Duration of Lesson: 1 hr

Lesson Title: Negative skin friction.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Importance of Negative skin friction.
2. Importance of Negative skin friction in single pile and in groups

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Negative skin friction in single pile
- Negative skin friction in groups

Assignment / Questions:

- Discuss about negative skin friction in single pile and in groups. (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 59 Duration of Lesson: 1 hrs

Lesson Title: Types of well foundations and Different shapes of well foundations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Differentiate various types and shapes of well foundations.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Well foundations
- Types
- Shapes of well foundations

Assignment / Questions:

- Describe the various types and shapes of well foundation with a neat sketch. (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 60 Duration of Lesson: 1 hrs

Lesson Title: Components of well foundation.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Describe the functions of various components of well foundations.

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Well foundations
- Components and functions

Assignment / Questions:

- Describe the various components of well foundation with a neat sketch. (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 61 Duration of Lesson: 1 hr

Lesson Title: Problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Discussion about numerical solutions in pile foundations

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Solving problems in pile foundation

Assignment / Questions:

- Evaluate the load carrying capacity and settlement of pile groups (6 piles in a group), both in sands and clays assuming length and suitable friction parameters. (Cob -5 CO-5)

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LESSON PLAN

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Lesson No: 62 Duration of Lesson: 1 hr

Lesson Title: Problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Discussion about numerical solutions in pile foundations

TEACHING AIDS : White Board, Marker and power point presentation.
TEACHING POINTS

- Solving problems in pile foundation

Assignment / Questions:

- Evaluate the load carrying capacity and settlement of piles (Cob -5 CO-5)

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TUTORIAL SHEET - 5

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. A group of 16 piles each 0.5m in diameter are arranged with 1m centre to centre spacing. The piles are embedded in clayey soil having cohesion 30kN/m^2. The length of the pile is 9m. Find the ultimate load capacity of the pile group. Neglect point bearing resistance. Take α=0.6.

2. Explain briefly about location and depth of shallow foundations.

3. Relate negative skin friction in pile foundation.

Course Objectives: 5
Course Outcomes: 5

Signature of faculty

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ASSIGNMENT SHEET – 5

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

1. Explain the components of well foundation.

2. Find the allowable pile load capacity of 30cm diameter concrete pile driven into the ground with the following properties. Loose sand with Ø=30°, γ_t=16.3kN/m^3 up to a depth of 4m below the ground surface. Soft clay with c=20kN/m^2,γ_t=15.2kN/m^3 up to depth of 3m is below the loose sand layer. Dense sand with Ø=34°, γ_t=17kN/m^3 up to depth of 5m below the clay layer. Water table is at great depth. Take α=1.0, Nq=137 and F.S=3.0.

3. Classify the types of piles based on mode of load transfer.

Course Objectives: 5
Course Outcomes: 5

Signature of faculty

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Department of Civil Engineering

COURSE COMPLETION STATUS

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya Dept.: Civil Engineering

Designation: Professor

Actual Date of Completion & Remarks, if any

Units	Remarks	No. of Objectives Achieved	No. of Outcomes Achieved
Unit 1	03-02-2022, Covered on time	1	1
Unit 2	18-02-2022, Covered on time	2	2
Unit 3	04-03-2022, Covered on time	3	3
Unit 4	13-04-2022, Covered on time	4	4
Unit 5	11-05-2022, Covered on time	5	5

Signature of HOD Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

COURSE COMPLETION STATUS

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: B

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Ms. T. Jahnavi Dept.: Civil Engineering

Designation: Assistant Professor

Actual Date of Completion & Remarks, if any

Units	Remarks	No. of Objectives Achieved	No. of Outcomes Achieved
Unit 1	03-02-2022, Covered on time	1	1
Unit 2	18-02-2022, Covered on time	2	2
Unit 3	08-03-2022, Covered on time	3	3
Unit 4	04-04-2022, Covered on time	4	4
Unit 5	10-05-2022, Covered on time	5	5

Signature of HOD Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

EVALUATION STRATEGY

Academic Year : 2021-22 Year: III Semester: II

Name of the Program: B.Tech Civil Engineering Section: A & B

Course/Subject: Foundation Engineering Course Code: GR18A3066

Name of the Faculty: Dr. C. Lavanya / Ms. T. Jahnavi Dept.: Civil Engineering

Designation: Professor / Assistant Professor

1. TARGET:
   a) Percentage for pass: 100%
   b) Percentage of class:

First class with distinction	90
First class	30
Pass class	10
Total strength	130

2. **COURSE PLAN & CONTENT DELIVERY**
   Course File

3. **METHOD OF EVALUATION**
   3.1 ☐ Continuous Assessment Examinations (CAE-I, CAE-II)
   3.2 ☐ Assignments/Seminars
   3.3 ☐ Mini Projects
   3.4 ☐ Quiz
   3.5 ☐ Semester/End Examination
   3.6 ☐ Others

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subjects in this Semester.
   - Online Teaching

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Course Outcomes - Program Outcomes Mapping
(Contributions: High, Medium and Low)

Foundation Engineering (GR18A3066)	**Program Outcomes / Program Specific Outcomes**													
Course Outcomes	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**	**PSO1**	**PSO2**
1. Identify the various soil exploration techniques and interpret the resulting soil profiles.	M	M	M											
2. Assess the stability of slopes.	M	H	H	H				M				M		M
3. Compute earth pressures and stability of retaining walls.	M	H	H	H				M				M		
4. Apply bearing capacity equations for shallow foundations and analyze settlement.	M	H	H	H				M		M		M		M
5. Estimate pile and pile group capacity for soils and recognize the shapes and components of well foundations.	M	H	H	H				M		M		M		

Foundation Engineering
Assignment I

1. Describe correction for overburden pressure and dilatancy in SPT test.
2. Explain about soil sampling methods and samplers.
3. Find the outside clearance, inside clearance and area ratio of a sampling tube given the outside diameter and inside diameter of the sampling tube are 100mm and 90mm respectively. And inside and outside diameter of cutting edge/driving shoe are 78mm and 120 mm respectively. Comment on the result computed?

Assignment II

1. Explain stability analysis by standard method of slices with a neat sketch.
2. Estimate the factor of safety with respect to cohesion against failure of the canal slope of 45°, for the below two conditions. Height of the canal is 6m below the ground surface and its soil properties are c=20kN/m^2, Ø=20°, e=0.85 and G_s=2.6.
   (i) when the canal is full of water (Take Sn=0.06)
   (ii) when there is a sudden draw down (Take Sn=0.16)

3. An excavation is to be made with a vertical cut in a cohesive soil with c_u=100kN/m^2, γ_t=19kN/m^3. Find the maximum depth of excavation so that the excavation is safe and stable. Take Sn=0.26.

Assignment III

1. Explain about stability of cantilever retaining wall with respect to factor of safety against sliding, overturning and bearing pressure.
2. A retaining wall with a smooth vertical back retains sand backfill for a depth of 8m. The backfill has a horizontal surface and has the following properties. C' = 0, $\varphi = 32^0$, γ = 19kN/m^3, γ_{sat} = 21kN/m^3. Calculate the magnitude of the total thrust against the wall for the conditions below.
   a) Backfill fully drained and the wall is free to yield.
   b) Wall free to yield and water table is at a depth of 3m with no drainage. Also, determine the point of application of the resultant thrust.

Assignment IV

1. Calculate the ultimate bearing capacity of a strip footing 2m wide and 1.5m deep. Also, calculate net allowable and allowable gross load assuming general shear failure condition. Take c=16kN/m^2, Ø=30°, γ=17kN/m^3, Nc=37.2, Nq=22.5, Nγ=19.7 and F.S=3. Use Terzaghi's theory.

2. Determine the safe bearing capacity of a rectangular footing of size 1m × 2m which is placed at a depth of 2m in a saturated clay having unit weight of 20kN/m^3 and unconfined compression strength of 100kN/m^2. Use Skempton's theory. Assume a factor of safety of 2.5.

3. A square footing of 1.5m x 1.5m in size is located at a depth of 1m below the ground surface. The footing is subjected to an eccentric load of 500kN with an eccentricity of 0.25m along one of the symmetrical axes. Calculate the factor of safety against bearing failure. Take c=60kN/m^2, Ø=0°, γ=20kN/m^3, Nc=5.14, Nq=1.0, Nγ=0. Use Meyerhoff's theory.

Assignment V

1. Find the allowable pile load capacity of 30cm diameter concrete pile driven into the ground with the following properties. Loose sand with Ø=30°, γ_t=16.5kN/m^3 up to a depth of 4m below the ground surface. Soft clay with c=20kN/m^2,γ_t=15.5kN/m^3 up to depth of 3m is below the loose sand layer. Dense sand with Ø=34°, γ_t=17kN/m^3 up to depth of 5m below the clay layer. Water table is at great depth. Take α=1.0, Nq=137 and F.S=3.0.

2. A group of 16 piles each 0.6m in diameter are arranged with 1m centre to centre spacing. The piles are embedded in clayey soil having cohesion 45kN/m^2. The length of the pile is 9m. Find the ultimate load capacity of the pile group. Take α=0.6.

RUBRICS

Academic Year : 2021-22
Semester : II
Name of the Program: B.Tech Civil Engineering Year: III Section: A & B
Course/Subject: Foundation Engineering Course Code: GR18A3066
Name of the Faculty: Dr. C. Lavanya / Ms. T. Jahnavi Dept.: Civil Engineering
Designation: Professor / Assistant Professor

Objective: To identify and solve foundation related problems using various theories.
Student Outcome: Learn various bearing capacity theories and solve engineering problems.

			Beginning	**Developing**	**Reflecting Development**	**Accomplished**	**Exemplary**	**Score**
S. No	**Name of the Student**	**Performance Criteria**	**1**	**2**	**3**	**4**	**5**	
1	x	The level of knowledge on basic concepts of shallow foundations	Low level of knowledge on basic concepts of shallow foundations	Able to understand the basic concepts of shallow foundations	Ability to explain the basic concepts of shallow foundations	Full knowledge on basic concepts of shallow foundations	Analysing and implementing the knowledge of basic concepts of shallow foundations	5
		The level of knowledge on various bearing capacity theories	Low level of knowledge on various bearing capacity theories	Able to understand various bearing capacity theories	Ability to explain various bearing capacity theories	Full knowledge on various bearing capacity theories	Analysing and application of knowledge of various bearing capacity theories	4
		The level of knowledge to solve engineering problems	Low level of knowledge to solve engineering problems	Able to understand and solve engineering problems	Ability to explain and solve engineering problems	Full knowledge to analyse and solve engineering problems	Analysing and implementing the solutions for engineering problems	3
							Average Score	4

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

III B.TECH. II SEM., I MID-TERM EXAMINATION, March-2022

FOUNDATION ENGINEERING (GR18A3066)

Time: 90 min Max. Marks: 15

DATE : 14/03/2022 (AN)

SUBJECTIVE

Answer any three Out of Four **3*5 = 15 Marks**

1	a. The dimensions of cutting edge of soil sampler are Inside diameter = 90mm Outside diameter = 150 and that of sampling tube are Inside diameter = 95 mm Outside diameter = 100mm Interpret the values of inside clearance and outside clearance	BT1	CO1
	b. Describe the process involved in Standard penetration test .	BT2	CO1
2	a. Calculate a critical angle of an infinite slope in a clay soil having c' = 20kN/m^2 ,Ø'= 20^0 , G_s = 2.72 and e = 0.9 (Depth of slope is 6m) when Soil is dry and when the slope is submerged with seepage parallel to the slope	BT4	CO2
	b. Illustrate the process involved in calculating the slope stability using standard method of slices	BT3	CO2
3	a. Explain Rankine's theory with neat sketches and also state the assumptions made.	BT5	CO3
	b. A retaining wall with a smooth vertical back retains a sand backfill for a depth of 6m . The backfill has a horizontal surface and has c' = 0 kN/m^2 ,Ø'= 28^0 , ɣ= 16 kN/m^3 Measure the magnitude of total thrust against the wall for conditions given below : Backfill fully drained but the top of the wall is restrained against yielding and Backfill fully drained and the wall is free to yield	BT5	CO3
4	a. Discuss any two boring methods involved in soil exploration	BT2	CO1
	b. Compare the stability of earth dams in case of steady seepage and sudden drawdown	BT4	CO2

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

III B.TECH. II SEM., I MID-TERM EXAMINATION, March-2022

FOUNDATION ENGINEERING (GR18A3066)

Duration: 10 min Max. Marks: 5

Name: **Roll No.**

Answer all the Multiple choice Questions

1. _____ is most suitable sampler to obtain an undisturbed sample for soft and sensitive clays [ ]
   (a) Split spoon sampler (c) Shelly tube Sampler
   (b) Scrapper bucket sampler (d) Piston sampler
2. Which of the following parameters stand as a measure for driving force? [ ]
   (a) Area ratio (c)Outside clearance
   (b) Inside clearance (d). Recovery ratio
3. Depth of exploration for a shallow footing of width B is _____ [ ]
   (a) 1.5 x B (b) 0.5 x B
   (c) 0.75 x B (e) B
4. An embankment has a slope of 30^0 which was constructed with the soil having C= $30kN/m^2$, $\varphi = 20^0$ and $\gamma=15\ kN/m^3$ .The height of the embankment is 20m . Using Taylor's stability number as 0.025 , the factor of safety with respect to cohesion is [ ]
   (a) 0.25 (c) 2
   (b) 4 (d) 1.5
5. Factor of safety for cohesion less soil on an infinite slope with sloping angle of 50^0 and angle of internal friction as 30^0 [ ]
   (a) 0.484 (c) 0.21
   (b) 0.72 (d) 0.84
6. Depth factor for Face failure [ ]
   (e) =1 (g) <1
   (f) >1 (h) =infinity
7. Basement walls are designed for [ ]
   (a) Active earth pressure (c) Passive earth pressure
   (b) At rest earth pressure (d) None of the above
8. Which of the following properties of soil is vital in case of At rest Earth pressure coefficient [ ]
   (a) Cohesion (c) Poisson's ratio
   (b) Permeability (d) Grain size
9. Rankine's theory assumes that _____ [ ]
   (a) Wall is rough (c) Soil is Heterogenous
   (b) Stress analysis is three dimensional (d) Wall is Smooth
10. Area ratio for a good quality sample should be [ ]
    (a) 8 % (c) 24%
    (b) 42% (d) 36%

Gokaraju Rangaraju Institute of Engineering and Technology
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II-Mid Term Examination (Descriptive) **May- 2022**
Sub: Foundation Engineering (GR18A3066) **Year: B.Tech III Year II Sem (2021-22)**
Date of Exam: 12/05/2022 (AN) **Max. Marks: 15** **Time: 90 Min**

Answer any Three questions.
All questions carry equal marks.

3*5 = 15 Marks

1.	Illustrate step by step procedure for Culmann's graphical method for cohesionless backfill of an active earth pressure with a neat sketch.	BT4	CO3
2.	a. Discuss various types of shallow foundation. b. A continuous footing of width 2.5m rests 1.5m below the ground surface in clay. Calculate the ultimate bearing capacity of the footing. Assume unit weight of soil is 16kN/m^3 and c = 75kN/m^2. Take Nc = 5.7, Nq = 1 and Nγ = 0	BT2 BT3	CO4 CO4
3.	A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of the piles were 40cm and 12m respectively. If the unconfined compression strength of the clay is 120kN/m^2 and the pile spacing is 75cm centre to centre, Determine the capacity of the group? Assume a factor of safety of 3.0 and adhesion factor of 0.8.	BT4	CO5
4.	a. Distinguish various principal modes of shear failure in shallow foundations. b. Interpret the components of well foundations with a neat sketch.	BT2 BT3	CO4 CO5

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B.Tech III Year-II Sem (2021-22) **II-Mid Term Examination, 12-05-2022 (AN)**
Foundation Engineering (GR18A3066)
Objective Exam

Name:_____ Hall Ticket No.: _____

Answer all the questions.
All questions carry equal marks. **Time: 10Min** **Max. Marks: 05**
Choose the correct alternative:

1. The coefficient of earth pressure for at rest condition is _____. [ ]
   (a) 1 + sin φ (b) 1 - sin φ (c) sin φ - 1 (d) none of the above

2. The position and line of action of the earth pressure are known in _____of lateral earth pressure.
   (a) Rankine's theory (b) Culmann's theory (c) Coulomb's theory (d) all the above [ ]

3. _____is equal to ultimate bearing capacity minus the stress due to the weight of the footing and any soil or surcharge directly above it. [ ]
   (a) Net ultimate bearing capacity (b) ultimate bearing capcity
   (c) safe bearing capacity (d) allowable bearing capacity

4. Skempton's bearing capacity analysis is used only for _____. [ ]
   (a) gravelly soils (b) silty soils (c) cohesionless soils (d) cohesive soils

5. _____ theory is suitable when the resultant load on the footing acts eccentrically with respect to the centre of the footing. [ ]
   (a) Terzaghi (b) Meyerhoff (c) Skempton (d) IS Code

6. In bearing capacity of granular soils based N value, if value of N is 30 – 40 and relative density is 85%, then the soil is described as _____. [ ]
   (a) loose (b) medium (c) dense (d) very dense

7. An open caisson is one which is, during construction is _____. [ ]
   a) open at the top and closed at the bottom b) Open both at the top and bottom
   c) Open at the bottom and closed at the top d) closed both at top and bottom

8. In general, N_c is the bearing capacity factor for pile foundations which is taken as _____. [ ]
   (a) 9 b) 15 (c) 17 (d) 25

9. _____ are the piles that are driven when horizontal load acts perpendicular to the pile axis.
   (a) Friction piles (b) Laterally loaded piles (c) Point bearing piles (d) Compaction piles [ ]

10. In well foundation,_____ is the main body of the well which transfers load to the subsoil. [ ]
    (a) steining (b) well curb (c) dredging (d) cutting edge

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