SRI BHARATHI

ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

Kaikkurichi, Pudukkottai -622 303

www.sbec.edu.in

NAAC DOCUMENTS

Quality Indicator Frame Work

Criterion – 1

CURRICULAR ASPECTS

Submitted by

IQAC

Internal Quality Assurance Cell

Sri Bharathi Engineering College for Women

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Criterion 1	Curricular Aspects	100

1.1 Curricular Planning and Implementation(20)

1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment

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SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF CIVIL ENGINEERING

PREFACE OF THE COURSE FILE

Batch	: **2018 -2021**
Academic Year	: **2020-2021/ ODD**
Program	: **BE CIVIL ENGINEERING**
Year & Semester	: **III Year / V Semester**
Course Code	: **CE8591** **NBA COURSE CODE: C304**
Name of the Course	: **FOUNDATION ENGINEERING**
Faculty Incharge	: **Mrs.P.Dennis Flora, AP/Civil**

12.8.20

Signature of the Faculty

12.8.20

HoD / Civil

HOD / CIVIL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303

Dr. S.THILAGAVATHI M.E.,Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

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DEPARTMENT OF CIVIL ENGINEERING

REVIEW OF COURSE FILE

(to be pasted on the inner side of the file-backside).(#-State Yes/No.)

S.NO	Details Date:	R-I-*	R-II-*&	R-III-*&	R-IV-*&$	R-V-*&$@
1.	Preface of the course file	Yes				
2.	Vision, Mission, PEOs, POs, PSOs, Blooms taxonomy	Yes				
3.	Subject handlers of yesteryears					
4.	Timetable/Workload of the staff – Distribution of teaching load – Roles and Responsibilities	Yes				
5.	Syllabus signed by staff & HoD	Yes				
6.	Lecture Schedule signed by staff & HoD	Yes				
7.	Course Committee meeting circular and minutes	Yes				
8.	Identification of Curricular gap and Content Beyond the syllabus	Yes				
9.	Self-study topics	Yes				
10.	Previous AU Question papers	Yes				
11.	Unit wise Q&A and Objective type questions	Yes				
12.	Unit wise course material	Yes				
13.	Assignment question paper with sample answer sheets and mark entry		Yes			
14.	Tutorial question paper with key and mark entry		Yes			
15.	Class test/IA test Q Paper with Key, sample answer papers and mark entry		Yes			
16.	IA Test- result analysis-CAP-evidence-root cause analysis.		Yes			
17.	Retest –Q paper-Attendance-marks		Yes			
18.	AU Web portal entry sheet		Yes			
19.	Very poor performance in first two tests-action taken.-communication to parents-evidence					
20.	Absence for two tests-action taken-communication to parents-evidence.					
21.	Indiscipline of student reported, if any					
22.	Special class/coaching class/remedial class/attendance-CAP					
23.	Conduct of Seminar, Quizzes - proof					
24.	Content beyond the syllabus - proof				Yes	
25.	Student feedback on faculty				Yes	
26.	Course end survey					
27.	Internal Assessment sheet				Yes	
28.	AU question paper with students feedback					
29.	Discrepancy of the question paper and correspondence, if any					
30.	AU result analysis-Details of arrear students.					
31.	AU grade sheet					Yes
32.	CO – PO & PSO attainment sheet					Yes
	Signature of Course handling faculty					
	Signature of HoD/Civil					

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DEPARTMENT OF CIVIL ENGINEERING

INDIVIDUAL STAFF WORKLOAD FOR ODD SEMESTER (2020-2021)

Sl. No	STAFF NAME	SUB.CODE & SUB.NAME	YEAR / SEM	HRS	TOT. HRS
1	Mr.S.Rajapandian	CE8302 Fluids Mechanics	II/III	05	17
		GE8152 Engineering Graphics (Sec A & B)	I / I	12	
2	Ms.R.Manju	EN8591 Municipal Solid Waste Management	IV/VII	05	13
		EN8491 Water Supply Engineering	III / V	05	
		CE8512 Water And Waste Water Analysis Laboratory	III / V	03	
3	Mrs.R.Priya	CE8701 Estimation, Costing and Valuation Engineering	IV/VII	05	13
		OTT752 Textile Effluents Treatments	IV/VII	05	
		CE8511 Soil Mechanics Laboratory (Skilled)	III / V	03	
4	Ms.G.Gayathri	CE8703 Structural Design and Drawing	IV/VII	07	13
		CE8501 Design of Reinforced Cement Concrete Elements	III / V	06	
5	Ms.S.Vidhya	CE8392 Engineering Geology	II / III	05	14
		CE8311 Construction Materials Laboratory (Skilled)	II/III	03	
		GE8152 Engineering Graphics (Sec B)	I/I	06	
6	Mrs.P.Dennis Flora	CE8591 Foundation Engineering	III / V/	05	16
		CE8351 Surveying	II / III	05	
		CE8511 Soil Mechanics Laboratory	III / V	03	
		CE8361 Surveying Laboratory	II / III	03	
7	Ms.N.Chithirai selvi	CE8702 Railways, Airports, Docks and Harbour Engineering	IV/VII	05	16
		CE8391 Construction Materials	II/II	05	
		CE8311 Construction Materials Laboratory	II/III	03	
		CE8361Surveying Laboratory (Skilled)	II / III	03	
8	Mrs.R.Padma Rani	CE8502 Structural Analysis I	IV/VII	05	13
		CE8301 Strength of Materials I	II/ III	05	
		CE8311 Construction Materials Laboratory (Skilled)	II/III	03	

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9	Ms.A.Kanaga	GE8071 Disaster Management	III / V	05	14
		GE8152 Engineering Graphics (Sec B)	I/I	06	
		CE8512 Water And Waste Water Analysis Laboratory (Skilled)	III / V	03	

HoD/Civil

Principal

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DEPARTMENT OF CIVIL ENGINEERING

COURSE PLAN

Subject code & Name: CE8591& Foundation Engineering	
Branch/Year/Sem: B.E CIVIL / III / V Subject	**Batch: 2018 -2021**
Staff Name: Mrs.P.Dennis Flora	**Academic year: 2020-2021**

COURSE OBJECTIVE

- To learn the planning and execute a detail site investigation programme.
- To select geotechnical design parameters and type of foundations.
- Also to learn the geotechnical design of different type of foundations and retaining walls.

TEXT BOOK:

T1. Murthy, V.N.S., "Text book of Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., New Delhi. 2014.

T2. Arora, K.R., "Soil Mechanics and Foundation Engineering", Standard Publishers and Distributors, New Delhi, 7th Edition, 2017 (Reprint).

T3. Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd. New Delhi, 16 Edition 2017.

REFERENCES:

R1 Braja M Das, "Principles of Foundation Engineering" (Eigth edition), Cengage Learning 2014.

R2 Kaniraj, S.R. "Design aids in Soil Mechanics and Foundation Engineering", Tata McGrawHill publishing company Ltd., New Delhi, 2014.

R3 Joseph E bowles, "Foundation Analysis and design", McGraw Hill Education, 5th Edition, 28th August 2015.

R4 IS Code 6403 : 1981 (Reaffirmed 1997) "Bearing capacity of shallow foundation", Bureau of Indian Standards, New Delhi.

R5 IS Code 8009 (Part 1):1976 (Reaffirmed 1998) "Shallow foundations subjected to symmetrical static vertical loads", Bureau of Indian Standards, New Delhi.

WEB RESOURCES

W1: https://archive.nptel.ac.in/courses/105/105/105105176/

W2: https://www.aboutcivil.org/foundation-types-construction-methods.html

W3: https://archive.nptel.ac.in/courses/105/105/105105185/

TEACHING METHODOLOGIES:

- BB - BLACK BOARD
- PPT - POWER POINT PRESENTATION

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CE8591 **FOUNDATION ENGINEERING** **L T P C**
3 0 0 3

OBJECTIVE:

- To impart knowledge to plan and execute a detail site investigation programme, to select geotechnical design parameters and type of foundations. Also to familiarize the students for the geotechnical design of different type of foundations and retaining walls.

UNIT I SITE INVESTIGATION AND SELECTION OF FOUNDATION **9**

Scope and objectives – Methods of exploration – Auguring and boring – Wash boring and rotary drilling – Depth and spacing of bore holes – Soil samples – Representative and undisturbed – Sampling methods – Split spoon sampler, Thin wall sampler, Stationary piston sampler – Penetration tests (SPT and SCPT) – Data interpretation - Strength parameters - Bore log report and Selection of foundation.

UNIT II SHALLOW FOUNDATION **9**

Location and depth of foundation – Codal provisions – Bearing capacity of shallow foundation on homogeneous deposits – Terzaghi's formula and BIS formula – Factors affecting bearing capacity – Bearing capacity from in-situ tests (SPT, SCPT and plate load) – Allowable bearing pressure – Seismic considerations in bearing capacity evaluation. Determination of Settlement of foundations on granular and clay deposits – Total and differential settlement – Allowable settlements – Codal provision – Methods of minimizing total and differential settlements.

UNIT III FOOTINGS AND RAFTS **9**

Types of Isolated footing, Combined footing, Mat foundation – Contact pressure and settlement distribution – Proportioning of foundations for conventional rigid behaviour – Minimum thickness for rigid behaviour – Applications – Compensated foundation – Codal provision

UNIT IV PILE FOUNDATION **9**

Types of piles and their functions – Factors influencing the selection of pile – Carrying capacity of single pile in granular and cohesive soil – Static formula – Dynamic formulae (Engineering news and Hileys) – Capacity from insitu tests (SPT and SCPT) – Negative skin friction – Uplift capacity-Group capacity by different methods (Feld's rule, Converse – Labarra formula and block failure criterion) – Settlement of pile groups – Interpretation of pile load test (routine test only), Under reamed piles – Capacity under compression and uplift – Cohesive – expansive – non expansive – Cohesionless soils – Codal provisions.

UNIT V RETAINING WALLS **9**

Plastic equilibrium in soils – Active and passive states – Rankine's theory – Cohesionless and cohesive soil – Coulomb's wedge theory – Condition for critical failure plane – Earth pressure on retaining walls of simple configurations – Culmann's Graphical method – Pressure on the wall due to line load – Stability analysis of retaining walls – Codal provisions.

TOTAL: 45 PERIODS

Signature of Faculty

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DEPARTMENT OF CIVIL ENGINEERING

Topic No	Topic Name	Books For reference	Page No	Teaching Methodology	No of periods required	Cumulative periods
UNIT I	**SITE INVESTIGATION AND SELECTION OF FOUNDATION**					**(9)**
1	Site reconnaissance	T3	859-860	BB	1	1
2	Site exploration	T3	860-862	BB	1	2
3	Methods of site exploration	T3	862-864	BB	1	3
4	Types of soil samples	T3	864-866	BB	1	4
5	Methods of samplers	T3	866-867	BB	1	5
6	Penetration and sounding tests	T3	867-868	BB	1	6
7	Geophysical methods	T3	868-869	PPT	1	7
8	Strength parameters and bore log report	T3	869-871	BB	1	8
9	Selection of foundation	T3	871-873	BB	1	9
UNIT –II	**SHALLOW FOUNDATION**					**(9)**
10	Types of foundation and depth of foundation	T3	705-707	BB	1	10
11	Bearing capacity of shallow foundation	T3	639-641	BB	1	11
12	Terzhagi's analysis and BIS formula	T3	641-643	BB	1	12
13	I.S code method for computing bearing capacity	T3	644-648	BB	1	13
14	Plate load tests-insitu test	T3	648-650	BB	1	14
15	Penetration tests(SPT and SPCT)	T3	650-655	PPT	1	15
16	Safe bearing presuure based on tolerable settlement	T3	682-684	BB	1	16
17	Permissible total and differential settlements	T3	684-686	BB	1	17

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18	Bearing capacity from building codes	T3	686-687	BB	1	18
UNIT – III FOOTINGS AND RAFTS						**(9)**
19.	Types of Isolated footing.	T3	707-708	PPT	1	19
20.	Types of Combined footing	T3	708-709	BB	1	20
21.	Design procedure of rectangular combined footing	T3	709-710	BB	1	21
22.	Design procedure of trapezoidal combined footing and strap footing	T3	710-711	BB	1	22
23	Types of mat foundation and its design procedure.	T3	711-712	BB	1	23
24.	Compensated foundation – Codal provision	T3	712-714	BB	1	24
25.	Contact pressure of footing on sand and clay soil	T3	714-716	BB	1	25
26	Pressure distribution of footing on sand and clay soil.	T3	716-718	BB	1	26
27	Proportioning of foundations for conventional rigid behaviour	T3	719-721	BB	1	27
UNIT IV PILE FOUNDATION						**(9)**
28	Types of piles and their functions	T3	725-727	BB	1	28
29	Carrying capacity of single pile in granular and cohesive soil	T3	727-729	BB	1	29
30	Capacity from insitu tests (SPT and SCPT)	T3	729-730	BB	1	30
31	Negative skin friction	T3	730-732	BB	1	31
32	Group capacity by different methods	T3	732-734	BB	1	32
33	Settlement of pile groups	T3	734-737	BB	1	33

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34	Interpretation of pile load test	T3	737-740	BB	1	34
35	Under reamed piles and Capacity under compression and uplift	T3	740-744	BB	1	35
36	Capacity under expansive and non-expansive of cohesive soil.	T3	744-750	BB	1	36
UNIT V	**RETAINING WALLS**					**(9)**
37	Plastic equilibrium in soils	T3	498-499	BB	1	37
38	Active and passive states	T3	499-503	BB	1	38
39	Rankine's theory on Cohesionless and cohesive soil	T3	503-504	BB	1	39
40	Coulomb's wedge theory on cohesionless and cohesive soil	T3	504-510	BB	1	40
41	Earth pressure on retaining walls of simple configurations	T3	510-512	BB	1	41
42	Culmann's Graphical method on retaining wall	T3	513-515	BB	1	42
43	Pressure on the wall due to line load	T3	516-520	BB	1	43
44	Condition for critical failure plane	T3	520-524	BB	1	44
45	Stability analysis of retaining walls	T3	524-526	BB	1	45

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DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOME

At the end of the course student will be able to

C304.1 Explain the site investigation, methods and sampling.
C304.2 Explain the bearing capacity and testing methods.
C304.3 Design shallow footings.
C304.4 Determine the load carrying capacity, settlement of pile foundation.
C304.5 Determine the earth pressure on retaining walls using various theories.
C304.6 Determine the stability analysis of retaining walls.

CONTENT BEYOND THE SYLLABUS

Methods of prevention and remediation of differential settlements.

INTERNAL ASSESSMENT DETAILS

ASSESMENT NUMBER	I	II	III	MODEL
UNITS	Unit 1 &2	Unit 3& half unit in Unit 4)	Half Unit in Unit 4 &Unit 5	All 5 units

ASSIGNMENT DETAILS

ASSIGNMENT NUMBER	I	II	III
DEAD LINE	28.08.20	6.10.20	3.11.20

ASSIGNMENT NUMBER	UNIT	DESCRIPTIVE QUESTIONS/TOPIC
I	I&II	Bearing capacity of shallow foundation.
II	III	Proportioning of foundations for conventional rigid behavior.
III	IV&V	Carrying capacity of single pile in granular and cohesive soil.

PREPARED BY
08/2020
Mrs.P.Dennis Flora, AP/Civil

VERIFIED BY
HoD/Civil
HOD / CIVIL
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KAIKKURICHI,
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APPROVED BY
07/09/20
Principal

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DEPARTMENT OF CIVIL ENGINEERING

Identification of Curricular Gap & Content Beyond Syllabus(CBS)

Name of the Faculty : Mrs.P.Dennis Flora

Course Code & Name: CE8591 & Foundation Engineering

Academic Year: 2020-2021/ODD

Degree & Program: B.E/CIVIL **Year/ Semester: III/V**

I. Mapping of Course Outcomes with POs & PSOs.(before CBS)

Table.1 Mapping of COs, PSOs with POs - before CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C304.1	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.2	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.3	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.4	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.5	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.6	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304	**3**	**2**	**1**	**1**	**-**	**-**	**2**	**1**	**1**	**3**	**1**	**1**	**3**	**2**	**2**

II. Identification of content beyond syllabus.

Table.2 Identification of content beyond syllabus

Details of Content Beyond Syllabus(CBS) added	POs strengthened/ vacant filled	CO/Unit
Methods of prevention and remediation of differential settlements	PO6 (2) Vacant filled	**C304.2 & C304.4/** II & IV

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III. Mapping of Course Outcomes with POs & PSOs. (After CBS)

Table.3 Mapping of COs, PSOs with Pos - after CBS.

CE8591	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C304.1	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.2	3	2	1	1	-	1*	2	1	1	3	1	1	3	2	2
C304.3	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.4	3	2	1	1	-	1*	2	1	1	3	1	1	3	2	2
C304.5	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.6	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304	**3**	**2**	**1**	**1**	**-**	**1***	**2**	**1**	**1**	**3**	**1**	**1**	**3**	**2**	**2**

Signature of the Faculty

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020-2021 (ODD SEM)

Assignment Question

Assignment – 02			Date of Issue:	1.10.20	Marks	10
Course code	CE8591	Course Title	Foundation Engineering			
Year	III	Semester	V	Date of Submission:	6.10.20	

Q.No	Questions	CO
1.	What is the contact pressure distribution below footing? a. Rigid footing on sand. b. Rigid footing on clay	C304.3
2.	What is the contact pressure distribution below footing? a. Flexible footing on sand. b. Flexible footing on clay.	C304.3
3.	Proportion a rectangular combined footing for uniform pressure under dead load+live load with following data and the allowable bearing pressure are dead load+reduced live load is 180 kN/m^2 and dead load+ live load is 270 kN/m^2. The centre to centre distance between the column is 5m. Projection of footing beyond column is 0.5m. Column load:	C304.3

LOAD	Column A	Column B
Dead load	500 kN	660 kN
Live load	400 kN	840kN

Name and Signature of the Faculty Incharge

P. Dennis Flora, AP/CIVIL

HoD/Civil

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020-2021 (ODD SEM)

Assignment Answer Sheet

Name of the Student : K. UMAMAHESWARI

AU Register Number: 912618103010

Assignment – 02			Date of Issue:	1.10.20	Marks	10
Course code	CE8591	Course Title	Foundation Engineering			
Year	III	Semester	V	Date of Submission:	6.10.20	

Q.No	Questions	CO
1.	What is the contact pressure distribution below footing? a. Rigid footing on sand. b. Rigid footing on clay	C304.3
2.	What is the contact pressure distribution below footing? a. Flexible footing on sand. b. Flexible footing on clay.	C304.3
3.	Proportion a rectangular combined footing for uniform pressure under dead load+live load with following data and the allowable bearing pressure are dead load+reduced live load is 180 kN/m^2 and dead load+ live load is 270 kN/m^2. The centre to centre distance between the column is 5m. Projection of footing beyond column is 0.5m. Column load:	C304.3

LOAD	Column A	Column B
Dead load	500 kN	660 kN
Live load	400 kN	840kN

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Content Quality	**6**	6
Presentation Quality	**2**	1
Timely submission	**2**	2
Total marks	**10**	9

6/10/20

Name and Signature of the Faculty Incharge

P. Dennis Flora, AP/CIVIL

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KAIKKURICHI,
PUDUKKOTTAI - 622 303

Dr. S.THILAGAVATHI M.E.,Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India.

DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020-2021 (ODD SEM)

Tutorial Question Paper

Tutorial – 02			Date of Issue:	04.09.2020	Marks	10
Course code	CE8591	Course Title	Foundation Engineering			
Year	III	Semester	V	Date of Submission:	18.09.2020	

Q.No	Questions	CO
1	A strip footing 2 m wide carries a load intensity of 400KN/m2 at a depth of 1.2 m on sand. A saturated unit weight of sand is 19.5KN/m^3 and unit weight above water table is 16.8 KN/m^3 .The shear strength parameter C=0,φ=36°,Determine the factor of safety for a following condition. 1)WT below 4m from GL 2)WT 1.2 m from GL 3) WT 2.5 m from GL	C304.1
2	A circular footing is resting on a stiff saturated clay with unconfined compression strength of 250 kN/m^2. The depth of foundation is 2m. Determine the diameter of the footing if the column load is 700 KN.	C304.1

Name and Signature of the Faculty Incharge

P. Dennis Flora AP/Civil

HoD/Civil

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020-2021 (ODD SEM)

Tutorial Answer Sheet

Name of the Student: V. MAHESHWARI

AU Register Number: 912618103003

Tutorial – 02			Date of Issue:	04.09.2020	Marks	10
Course code	CE8591	Course Title	Foundation Engineering			
Year	III	Semester/Section	V	Date of Submission:	18.09.2020	

Q.No	Questions	CO
1	A strip footing 2 m wide carries a load intensity of 400KN/m2 at a depth of 1.2 m on sand. A saturated unit weight of sand is 19.5KN/m^3 and unit weight above water table is 16.8 KN/m^3 .The shear strength parameter C=0,φ=36°,Determine the factor of safety for a following condition. 1)WT below 4m from GL 2)WT 1.2 m from GL 3) WT 2.5 m from GL	C304.2
2	A circular footing is resting on a stiff saturated clay with unconfined compression strength of 250 kN/m^2. The depth of foundation is 2m. Determine the diameter of the footing if the column load is 700 KN.	C304.2

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Problem solving approach	6	6
Correctness of Answer	2	2
Timely submission	2	1
Total marks	10	9

18/9/20

Name and Signature of the Faculty Incharge

P. Dennis Flora AP/CIVIL

18/9/20

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IQAC Academic Audit Form

ACADEMIC YEAR: 2020-2021 ODD SEMESTER

Name of Department :	CIVIL	Year / Sem :	III / V	No. of Students Registered :	05
Details of Examination :	Cycle Test -1 / Cycle Test -2 / Cycle Test -3 / Model Test				

S.No.	Course Code & Name	List of Reg.No Verified	Course Log Book Verified (Y / N)	Course File Verified (Y / N)	No of students Passed	No of Absentees	No of Failures	Pass %	Remarks
1.	CE8501 - Design of Reinforced Cement Concrete Elements	912618103010	Yes	Yes	05	-	-	100%	-
2.	CE8502 - Structural Analysis - I	912618103008	Yes	Yes	05	-	-	100%	-
3.	EN8491 - Water Supply Engineering	912618103003	Yes	Yes	05	-	-	100%	-
4.	CE8591 - Foundation Engineering	912618103005	Yes	Yes	05	-	-	100%	-
5.	GE8071 - Disaster Management	912618103009	Yes	Yes	05	-	-	100%	-
6.	OR0551 - Renewable Energy Source.	912618103003	Yes	Yes	05	-	-	100%	-

Verified by

External Member Name and Signature:	C. Palaniappan 9/10/20 [C. PALANIAPPAN, AP/ECE]
Internal Member Name and Signature:	P. Dennis 9/10/20 P. Dennis Flora, AP/Civil

Overall Remarks:

R. [illegible]
HoD/ Civil

9/10/20
IQAC Coordinator

Principal 6/10/20

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020 – 2021 (ODD SEMESTER)

SUBJECT CODE &TITLE: CE8591& Foundation Engineering

YEAR/SEM: III/V

STUDENT FEEDBACK ON FACULTY

S.NO.	DESCRIPTION	SCORED OUT OF 4	SCORED OUT OF 100
1.	Syllabus coverage as prescribed by University	3.6	90
2.	Technical knowledge of the teacher	3.8	95
3.	Teacher's communication skill	3.8	95
4.	Regularity in taking classes	3.6	90
5.	Helping the students in conducting the experiment through set of instructions and demonstrations	3.6	90
6.	Tendency of inviting opinion and questions on subject matter from students.	3.8	95
7.	Knowledge of the teacher in latest development of field	3.8	95
8.	Perfectness of valuation	3.6	90
OVERALL SCORE		**3.72**	**92.5**

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REPORT SHEET

S.NO	REG.NO	NAME	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	912618103003	MAHESHWARI.V	4	4	4	3	3	4	3	4
2	912618103005	MEENACHI.K	3	3	4	4	4	4	4	3
3	912618103008	SATHYA.M	3	4	4	4	4	4	4	4
4	912618103009	SRIVIDHYA.S	4	4	3	4	4	3	4	4
5	912618103010	UMAMAHESWARI.K	4	4	4	3	3	4	4	3
		AVERAGE	3.6	3.8	3.8	3.6	3.6	3.8	3.8	3.6
		PERCENTAGE	90	95	95	90	90	95	95	90

EXCELLENT	VERY GOOD	GOOD	AVERAGE	POOR
4	3	2	1	0

Signature of the Faculty

HoD/Civil

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SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN
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Circular Date: 17.09.2020

The second cycle test will be conducted through online from 24.09.2020 to 26.09.2020 for the III semester(II Year) and V Semester (III year) and VII semester(IV Year) students .

The following instructions are to be followed by the faculty members.

- Total marks for which the question paper to be set will be for 60 marks.
- It is the responsibility of the question paper to be setter to crete online Google form /multiple Choice Questions (MCQ) and forward the link to the exam coordinators Mr.J.Sathyaraj, AP/EEE Mrs.G.Bhvaneswari, AP/CSE on or before 21.09.2020.
- Question Pattern-Part A-30 Single mark MCQ questions and Part B-15 two mark MCQ questions.
- All Staff members are requested to enble the shuffle question order option and limit to one response option in Google form settings.
- The exam coordinators (exam cell) are requested to make necessary arrangements for conducting the test.
- Faculty members are requested to take the report on Google forms and give the marks to the students on or before 28.09.2020.

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Cc:

- All faculty
- Exam cell
- Office file

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Circular

Date: 17.09.2020

The second cycle test will be conducted through online from 24.09.2020 to 26.09.2020 for the V semester (III Year) students for 60 marks as per the timetable given below. Students are directed to prepare well and score good marks.

Date	10.00 am – 11.30 am	02.00 pm – 03.30pm
24.09.2020	CE8591-Foundation Engineering(CIVIL) MA8551-Algebra and Number Theory (CSE) EC8552-Computer Architecture and Organization (ECE) EE8551- Microprocessor and Microcontrollers (EEE)	ORO551-Renewable Energy Source (CIVIL) OMD551-Baics of Biomedical Instrumentation (EEE/ECE/CSE)
25.09.2020	CE8501-Design of Reinforced Cement Concrete Elements (CIVIL) CS8501-Theory of Computation (CSE) EC8553- Discrete Time Signal Processing (ECE) EE8501-Power System Analysis (EEE)	EN8491-Water Supply Engineering (CIVIL) CS8592-Object Oriented Analysis and Design(CSE) EC8551-Communication Networks (ECE) EE8552-Power Electronics(EEE)
26.09.2020	CE8502-Structural Analysis I(CIVIL) CS8591-Computer Networks (CSE) EC8501-Digital Communication (ECE) EE8591-Digital Signal Processing(EEE)	GE8071- Disaster Management (CIVIL) EC8073-Medical Electronics (ECE) EC8691-Microprocessor and Microcontrollers (CSE) CS8392- Object Oriented Programming (EEE)

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17/09/20

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Cc:

- All III year B.E Classes
- All faculty
- Exam cell
- Notice Board
- Office file

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Register Number:												

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Cycle Test - II			Date/Session	24.09.20/FN	Marks	60
Course code	CE8591	Course Title	Foundation Engineering			
Regulation	2017	Duration	90 minutes	Academic Year	2020-2021 (Odd Sem)	
Year	III	Semester	V	Department	Civil	

COURSE OUTCOMES: At the end of the course student will be able to

C304.1	Explain the site investigation, methods and sampling.
C304.2	Explain the bearing capacity and testing methods.
C304.3	Design shallow footings.
C304.4	Determine the load carrying capacity, settlement of pile foundation.
C304.5	Determine the earth pressure on retaining walls using various theories
C304.6	Determine the stability analysis of retaining walls

Q.No.	Question	CO	BTL
	PART A **(Answer all the Questions 30 x 1 = 30 Marks)**		
1	The total settlement of a footing in clay is considered to be consisting of _____ components. a) One b) Three c) Two d) Four	**C304.3**	K1
2	The component Sc, used in the total settlement of clay refers to which of the following? a) Total settlement b) Consolidation settlement c) Immediate plastic settlement d) Settlement due to secondary consolidation of clay	**C304.3**	K2
3	The immediate settlement can be computed from the expression, based on _____ a) Theory of plasticity b) Theory of elasticity c) Terzaghi's analysis d) Pressure distribution	**C304.3**	K1
4	The influence factor for rigid square footing is _____ a) 0.88 b) 0.82 c) 1.06 d) 1.70	**C304.3**	K2
5	The value of Es used in the immediate settlement equation, can be found out using a) Triaxial test b) Compression test c) Direct shear test d) Rankine's theory	**C304.3**	K2
6	The maximum load which can be carried by a pile is defined as its _____ a) Ultimate load carrying capacity b) Ultimate bearing resistance c) Ultimate bearing capacity d) All of the mentioned	**C304.4**	K1

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7	The allowable load which the pile can carry safely is determined on the basis of _____ a) Factor of safety b) Load test c) Stability of the pile foundation d) All of the mentioned	**C304.4**	K2
8	The load carrying capacity of a pile can be determined by which of the following methods? a) Dynamic formulae b) Static formulae c) Plate load test d) All of the mentioned	**C304.4**	K2
9	When a pile hammer hits the pile, the total driving energy is equal to _____ a) Weight of hammer times the height of drop b) Weight of the ram time times the height of the stroke c) Sum of the impact of the ram d) Sum of the impact of ram plus the energy delivered by explosion	**C304.4**	K2
10	There are _____ types of bored piles. a) 4 b) 2 c) 5 d) 3	**C304.4**	K1
11	A combined footing may be rectangular in shape if both the columns carry _____ a) Unequal loads b) Equal loads c) No load d) All of the mentioned	**C304.3**	K1
12	The influence factor Iw for rigid rectangular footing with L/B = 1.5 is _____ a) 0.88 b) 0.82 c) 1.70 d) 1.06	**C304.3**	K1
13	The foundation that is used when the soil mass is sufficiently erratic? a) Strap footing b) Combined footing c) Mat footing d) Rectangular combined footing	**C304.3**	K2
14	Usually, rafts are designed as _____ a) Reinforced slabs b) Reinforced concrete flat slabs c) Ordinary concrete slab d) Inverted flat slabs	**C304.3**	K1
15	The weight of the raft is not considered in the structural design, because _____ a) Weight is carried by subsoil b) Raft does not remain contact with soil c) The weight is transferred to column d) All of the mentioned	**C304.3**	K1
16	The net ultimate bearing capacity for raft may be determined by _____ a) Skempton's equation and Terzaghi's equation b) Darcy's equation c) None of the mentioned d) All of the mentioned	**C304.3**	K2
17	In raft footing, if the C.G of the load coincide with the centroid of the raft, the upward load is considered as _____ a) Non uniform pressure	**C304.3**	K1

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	b) Uniform pressure c) Excess pressure d) None of the mentioned		
18	Raft is subdivided in to series of beams to establish _____ a) Shear failure and Moment diagrams b) Pressure distribution c) None of the mentioned d) All of the mentioned	**C304.3**	K1
19	The penetration resistance N for designing of raft should be taken at _____ intervals. a) 50 cm b) 60 cm c) 75 cm d) 20 cm	**C304.3**	K1
20	If the penetration resistance N is less than 5, which of the following measures can be adopted? a) Using piles and piers and Compacting sand b) Using inverted flat slab c) None of the mentioned d) All of the mentioned	**C304.3**	K2
21	Both conventional and flexible method can be used only in the case when _____ a) Foundation is laid on cohesive soil b) Soil pressure is low c) Foundation is flexible d) Load is concentrated on larger area	**C304.3**	K2
22	The foundation that is used when the soil mass is sufficiently erratic? a) Strap footing b) Combined footing c) Mat footing d) Rectangular combined footing	**C304.3**	K2
23	If a maximum settlement of 50 mm is permitted for a raft, the differential settlement must not exceed _____ a) 30 mm b) 10 mm c) 20 mm d) 25 mm	**C304.3**	K1
24	Usually, rafts are designed as _____ a) Reinforced slabs b) Reinforced concrete flat slabs c) Ordinary concrete slab d) Inverted flat slabs	**C304.3**	K1
25	The weight of the raft is not considered in the structural design, because _____ a) Weight is carried by subsoil b) Raft does not remain contact with soil c) The weight is transferred to column d) All of the mentioned	**C304.3**	K1
26	In bored pile, concreting is done by using _____ a) Auger b) Casing tube c) Under-reamer d) Concrete plug	**C304.4**	K1
27	A major difference between the procedure of construction in bored piles and cast-in-situ driving piles is _____ a) Driving equipment	**C304.4**	K1

	b) Method of driving c) Concrete filling d) None of the mentioned		
28	The type of bored pile that is suitable for congestion sites? a) Under-reamed piles b) Bored compaction piles c) Pressure piles d) Simplex piles	**C304.4**	K1
29	In pressure piles, the soil is excavated by _____ a) Casing tube b) Under-reamer c) Concrete plug d) All of the mentioned	**C304.4**	K1
30	When the under-reamed pile has only one bulb, it is called _____ a) Multi-under reamed pile b) Single-under reamed pile c) Unique-under reamed pile d) All of the mentioned	**C304.4**	K2
	PART B **(Answer all the Questions 15 x 2 = 30 Marks)**		
31	The possible method adopted for designing of raft foundation is _____ a) Conventional method b) Elastic method c) Soil line method d) All of the mentioned	**C304.3**	K1
32	The conventional method for designing raft foundation is based on which of the following assumptions? a) Foundation is infinitely rigid and Soil pressure is assumed to be planar b) Overburden pressure is assumed as zero c) None of the mentioned d) All of the mentioned	**C304.3**	K2
33	The method that can be used for designing raft, based on elastic method? a) Simplified elastic foundation and Truly elastic foundation b) Conventional elastic foundation c) None of the mentioned d) All of the mentioned	**C304.3**	K2
34	In truly elastic foundation, the soil is assumed to be obey _____ a) Terzaghi's theory b) Hooke's law c) Skempton's theory d) All of the mentioned	**C304.3**	K1
35	Both conventional and flexible method can be used only in the case when _____ a) Foundation is laid on cohesive soil b) Soil pressure is low c) Foundation is flexible d) Load is concentrated on larger area	**C304.3**	K2
36	The modulus of subgrade reaction is applicable only when the load is applied through a) Plate of size 30 ×30 cm and Beam 30 cm wide on soil area b) Plate size is 10 × 10 cm c) None of the mentioned d) All of the mentioned	**C304.3**	K2
37	In effect of shape method, the columns loads and bearing pressure distribution are divided into _____ system of forces. a) Two	**C304.3**	K1

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	b) Four c) Three d) Five		
38	The first system of forces consist of _____ a) Difference between actual column loads b) Varying distributed load acting downwards c) Column support reaction acting downwards d) All of the mentioned	**C304.3**	K1
39	The diameter of the under-reamed pile is kept equal to _____ times the diameter of pile steam. a) 4 b) 5 c) 2.5 d) 2	**C304.4**	K1
40	Under-reamed pile foundation is most suitable for _____ type of condition. a) Seasonal moisture change b) Dry conditioned soil c) Cohesive type of soil d) All of the mentioned	**C304.4**	K1
41	The load carrying capacity of a under-reamed pile may be determined by _____ a) Safe load test b) Penetration test c) Pile load test d) Cyclic load test	**C304.4**	K1
42	The under-reamed piles are connected by a beam known as _____ a) Capping beam and Grade beam b) Reamed beam c) None of the mentioned d) All of the mentioned	**C304.4**	K1
43	The spacing of the piles in under-reamed pile foundation depends on which of the following factor? a) Nature of the ground and Type of pile b) Load acting on the pile c) None of the mentioned d) All of the mentioned	**C304.4**	K2
44	In which of the following rule, the value of each pile is reduced by one-sixteenth? a) Converse Labarre formulae b) Feld's formulae c) Seiler-Keeney formulae d) All of the mentioned	**C304.4**	K2
45	The downward drag acting on a pile due to the movement of the surrounding is called a) Skin friction b) Negative skin friction c) Frictional force d) None of the mentioned	**C304.4**	K1

Course Faculty

(Name /Sign / Date)

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(Name /Sign / Date)

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020 – 2021 (ODD SEMESTER)

CE8591 - FOUNDATION ENGINEERING

ANSWER KEY FOR CYCLE TEST-II

QN	ANSWER	QN	ANSWER	QN	ANSWER	QN	ANSWER	QN	ANSWER
1	B	11	B	21	C	31	D	41	A
2	B	12	D	22	C	32	A	42	A
3	B	13	C	23	B	33	A	43	A
4	B	14	B	24	A	34	B	44	B
5	A	15	A	25	B	35	C	45	B
6	D	16	A	26	B	36	A		
7	C	17	B	27	A	37	C		
8	D	18	C	28	C	38	C		
9	A	19	A	29	B	39	C		
10	D	20	C	30	B	40	A		

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020-2021 (ODD SEMESTER)

STUDENTS MARK STATEMENT- CO BASED

CYCLE TEST-II

SUBJECT CODE &TITLE: CE8591& Foundation Engineering

YEAR/SEM: III/V **MONTH & YEAR: SEPTEMBER-2020**

S.NO	REG NO	STUDENT NAME	CO3 (36)	CO4 (24)	TOTAL (60)	TOTAL (100)
1.	912618103003	MAHESHWARI V	25	15	40	66
2.	912618103005	MEENACHI K	33	21	54	90
3.	912618103008	SATHYA M	35	20	55	92
4.	912618103009	SRIVIDHYA S	34	22	56	94
5.	912618103010	UMAMAHESWARI K	34	20	54	90

MARKS RANGE:

<20	20-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
-	-	-	-	-	1	-	2	2

Total No. of Candidates Present	05
Total No. of Candidates Absent	-
Total No. of Students Pass	05
Total No. of Students Fail	-
Percentage of Pass	100%

Faculty Incharge

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Principal

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ACADEMIC YEAR 2020 – 2021 (ODD SEMESTER)

FINAL INTERNAL STUDENTS MARK STATEMENT (Out of 20)

SUBJECT CODE &TITLE: CE8591& Foundation Engineering

YEAR/SEM: III/V

S.NO	REG NO	STUDENT NAME	TOTAL (20)
1.	912618103003	MAHESHWARI V	14
2.	912618103005	MEENACHI K	18
3.	912618103008	SATHYA M	18
4.	912618103009	SRIVIDHYA S	19
5.	912618103010	UMAMAHESWARI K	18

Faculty Incharge

HoD/Civil

HOD / CIVIL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303

Principal

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PUDUKKOTTAI DISTRICT

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SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India.

DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2020 – 2021 (ODD SEMESTER)

ANNA UNIVERSITY RESULT STATEMENT NOV/DEC-2020

SUBJECT CODE &TITLE: CE8591 & FOUNDATION ENGINEERING

YEAR/SEM: III/V

S.NO	REG NO	STUDENT NAME	GRADE
1.	912618103003	MAHESHWARI V	B
2.	912618103005	MEENACHI K	U
3.	912618103008	SATHYA M	U
4.	912618103009	SRIVIDHYA S	B^+
5.	912618103010	UMAMAHESWARI K	B

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SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN, KAIKKURICHI

Department of Civil Engineering

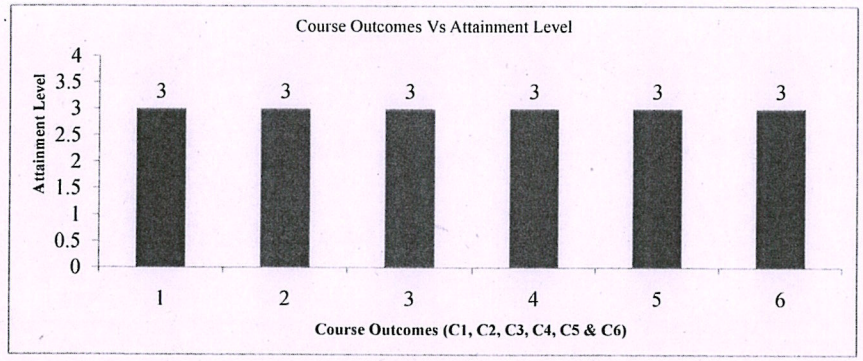
Internal Assessment -Attainment of Course Outcomes (Through Direct Assessment)

ACADEMIC YEAR - 2020-21		BATCH	2018-2022					
COURSE CODE/TITLE	CE8591 (304) / FOUNDATION ENGINEERING	COURSE OUTCOME	1	2	3	4	5	6
YEAR/SEM.	III/V	TARGET(%)	65	65	65	65	65	65
COURSE COORDINATOR	Mrs.P.Dennis Flora	TOTAL STRENGTH	5					

ATTAINMENT LEVEL	Level	Range
	1	UP TO 60% of the students scored more than target
	2	61 - 79% of the students scored more than target
	3	80% & ABOVE of the students scored more than target

S.NO	REG NO	NAME OF THE STUDENT	IAT 1 - MARKS ALLOTED						IAT 2 - MARKS ALLOTED						IAT 3 - MARKS ALLOTED						Assignment / Mini Project /Tutorial / Seminar						TOTAL COURSE OUTCOME					
			C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6
			60	40							40	60							60	40		10	10			10	60	50	50	60	60	50
1	912618103003	MAHESHWARI V	42	28							26	40							41	28		9	8			8	42	37	34	40	41	36
2	912618103005	MEENACHI K	53	35							36	54							55	36		9	9			8	53	44	45	54	55	44
3	912618103008	SATHYA M	55	37							37	55							56	37		8	7			9	55	45	44	55	56	46
4	912618103009	SRIVIDHYA S	57	38							38	56							56	38		8	9			8	57	46	47	56	56	46
5	912618103010	UMAMAHESWARI K	53	36							36	54							55	37		8	8			9	53	44	44	54	55	46

CO's Target Value	39.0	32.5	32.5	39.0	39.0	32.5
No. of Students scored above CO's Target Value	5	5	5	5	5	5
Percentage of Students scored above Target	100.0	100.0	100.0	100.0	100.0	100.0
CO Attainment	3	3	3	3	3	3
CO attainment Values to plot the Graph	3	3	3	3	3	3



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SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN
DEPARTMENT OF CIVIL ENGINEERING
COURSE OUTCOME ATTAINMENT - UNIVERSITY EXAMINATION
ACADEMIC YEAR : 2020 - 2021 (ODD SEM)

YEAR /SEM: III/V **Batch:2018-2022**

SUBJECT :CE8591 (304) / FOUNDATION ENGINEERING

CO Attainment Level: 1 - (UPTO 60%) 2- (61%-79%) 3-(80% and Above)

TOTAL STRENGTH : 5

S.NO	Register No	NAME	Univ. Grade
1	912618103003	MAHESHWARI V	B
2	912618103005	MEENACHI K	U
3	912618103008	SATHYA M	U
4	912618103009	SRIVIDHYA S	B+
5	912618103010	UMAMAHESWARI K	B

No. of O Grade	0	0
No. of A+ Grade	0	0
No. of A Grade	0	0
No.of B+ Grade	1	1
No. of B Grade	2	2
No. of U Grade	2	2
No. of UA Grade	0	0

Target for course outcome Attainment	60	5
No of students above the target	3	
CO-Attainment University (%)	60.00	

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Overall Attainment Sheet – COs - POs & PSOs attainment calculation

CO	CO-Attainment Internal (CO-INT) (Avg. Attainment of All section) (%)	CO-Attainment University (CO-UNI) (Avg. Attainment of All section) (%)	Direct CO Attainment (0.20xCO-INT + 0.80xCO-UNI) (%)	CO Attainment Level
C304.1	100.0	60.00	68.0	2
C304.2	100.0	60.00	68.0	2
C304.3	100.0	60.00	68.0	2
C304.4	100.0	60.00	68.0	2
C304.5	100.0	60.00	68.0	2
C304.6	100.0	60.00	68.0	2

Expected CO-PO Level

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C304.1	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.2	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.3	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.4	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.5	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304.6	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
C304	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2

PO Attainment Level

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C304.1	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33
C304.2	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33
C304.3	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33
C304.4	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33
C304.5	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33
C304.6	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33
C304	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33

Attainment of POs and PSOs:

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C304	3	2	1	1	-	-	2	1	1	3	1	1	3	2	2
Attainment	2	1.33	0.67	0.67	-	-	1.33	0.67	0.67	2	0.67	0.67	2	1.33	1.33

Comments by Program Coordinator

1.

2.

Remarks by HoD

Name and Signature of the Faculty Member

[P.Dennis Flora, AP/CIVIL]

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