ShriShankaracharya Technical Campus,

ShriShankaracharya Group of Institutions

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

Courses of Study and Scheme of Examination of M. Tech

SCHEME OF EXAMINATION

M-Tech (Civil) with Specialization in Geotechnical Engineering

III SEMESTER

S. No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Examination Theory/ Practical			Total Marks	Credit L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Civil Engg.	CE223301	Earth and Earth Retaining Structures	3	1	-	100	20	20	140	4
2	Refer Table- III		Elective-III	3	1	-	100	20	20	140	4
3	Civil Engg.	CE223391	Preliminary work on Dissertation	-	-	28	100	-	100	200	14
4	Civil Engg.	CE223392	Seminar Based on Dissertation	-	-	3	-	-	20	20	2
	TOTAL			**6**	**2**	**31**	**300**	**40**	**160**	**500**	**24**

L- Lecture **T-** Tutorial
P- Practical, **ESE-** End Semester Exam
CT- Class Test **TA-** Teacher's Assessment

Table- III

ELECTIVE- III			
S. No.	**Board of Study**	**Subject Code**	**NAME OF SUBJECT**
1	Civil Engg.	CE223321	Analysis and Design of Foundation Structures
2	Civil Engg.	CE223322	Traffic Engineering
3	Civil Engg.	CE223323	FEM in GeotechEngineering

Note (1) – **1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session.**

Note (2) – **Choice of elective course once made for an examination cannot be changed in future examinations.**

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Subject Code	Earth and Earth Retaining Structures	L = 3	T = 1	P = 0	Credits = 4
CE223301	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
This course will enable students to 1. To study the geostatic stresses. 2. To study the shear strength of soils. 3. To study the static earth pressure for retaining walls. 4. To study the slope stability for retaining walls.	After studying this course, students will be able to: **CO-1:** To analyze the field problems and encountering various failures due to shear geostatic stress etc. **CO-2:** To design the and analyze the retaining structures for earth pressures **CO-3:** To design and analyze suitable slope stability. **CO-4:** To understand the seepage in soils for design of dams.

UNIT- I **CO1**

Geostatic Stresses: Total, neutral and effective stress in homogeneous soils, stress diagrams, stresses effected by Capillary water and direction of flow of water. Numerical problems Shear Strength of Soils: Introduction, concept of stresses, Principal stresses, principal planes, Mohr's construction, location of pole, basic concept of shearing resistance, Coulomb's theory, Mohr-Coulomb's theory. Numerical problems. [8Hrs]

UNIT – II **CO1**

Determination of Shear strength parameters, stress controlled and strain controlled tests, classification of shear tests based on drainage conditions, stress-strain relationship of clays and sands, concept of critical void ratio, determination and uses of Skempton's pore pressure coefficients A and B experimentally. Numerical problems [8Hrs]

UNIT – III **CO2**

Earth Pressure: Introduction, active and passive earth pressures, earth pressure at rest, Rankine's theory for determination of active and passive earth pressure, coefficient of earth pressure at rest, earth pressure distribution, total earth pressure and its point of application, Coulomb's theory of active and passive earth pressure, Culmann's and Rebhann's graphical methods for determination of active and passive earth pressures. [8Hrs]

UNIT – IV **CO3**

Stability of Slopes: Introduction, Factor of Safety, slope failure, toe and base failure of finite slopes, analysis of stability by method of slices, Taylor's stability number, effect of water table on slopes, tension cracks. [8Hrs]

UNIT – V **CO4**

Seepage Analysis: Laplace's equation for two dimensional flow of water through soils, flownets, properties and uses of flownets, phreatic line, graphical and analytical procedures for determination of quantity of seepage, prevailing hydraulic head and exit gradientin homogeneous earth dam, uplift pressure, [8Hrs]

Text Books:

S. No.	Title	Authors	Edition	Publisher
1	Foundation analysis and design	J E Bowles, McGraw Hill, NY	Third	McGraw Hill, NY
2	Soil Mechanics in Engineering Practice	Karl Terzaghi and R B Peck (1967)	second	John Wiley and Sons, NY

Reference Books:

S.No.	Title	Authors	Edition	Publisher
1	Soil Mechanics and Foundation Engineering	S K Garg	Tenth	Khanna Publications
2	Geotechnical Engineering	C Venkataramaiah	fourth	New Age International Publishers

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M-Tech (Civil) with Specialization in Geotechnical Engineering

Subject Code	Analysis and Design of Foundation Structures	L = 3	T = 1	P = 0	Credits = 4
CE223321	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
The objective is to make the students understand and conceptualize the design and analysis of shallow and deep foundation practice.	On successful completion of the course, the student will be able to: **CO1:-**Learn design of shallow foundation **CO2:-** To study pile foundation **CO3:-** To study soil structure interaction **CO4:- learn sub grade** **CO5:-**To analyse recent soil problems

Unit-I Shallow foundation **CO 1**

Analysis and design by conventional method, Shallow foundation structure, single footing, combine footing and mat foundation [8Hrs]

Unit-II Pile foundation **CO 2**

Pile cap, eccentrically loaded foundation, Group piles, under reamed pile [8Hrs]

Unit-III Soil structure interaction **CO 3**

Foundation subject to lift and overturning, Soil structure interaction [8Hrs]

Unit-IV Sub grade **CO 4**

Sub grade reaction method, Finite difference and matrix method, Elasticity theory method, Application to various foundation problems [8Hrs]

Unit-V Soil problems **CO 5**

Evaluation to relevant soil problem, Evaluation of recent soil problem, recent advance [8Hrs]

1. **Text Books:**

S.No.	Title	Authors	Edition	Publisher
1	Principles of Foundation Engineering	Das B.M.	7	CL Engineering
2	Design of Foundation Systems	Ninan P Kurian	3	Narosa Publishing House
3	Analysis and Design of Substructures	Swami Saran	4	Oxford and IBH Publishing, New Delhi

2.

3. **ReferenceBooks:**

S. No.	Title	Authors	Edition	Publisher
1	Design of Reinforced Concrete Foundations	Varghese P. C	3	PHI Learning
2	Foundation Design in Practice	GhoshKaruna Moy	4	PHI Learning

				October 2020	1.00	Applicable for AY 2020-21 Onwards
Chairman (AC)	Chairman (BoS)	Expert Member by CSVTU	Expert Member by Outside University	Date of Release	Version	

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M-Tech (Civil) with Specialization in Geotechnical Engineering

Subject Code	Traffic Engineering	L = 3	T = 1	P = 0	Credits = 4
CE223322	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
The objective is to make the students understand and conceptualize the function of traffic and survey understand the control devices for traffic , street light and capacity also the theory of traffic flow .	On successful completion of the course, the student will be able to: **CO1:-**Learn to functions of traffic. **CO2:-** To study the traffic survey **CO3:-** to study about traffic control devices **CO4:-** learn to strret lighting and capacity of highway **CO5:-**Learn about traffic flow theory

UNIT I: INTRODUCTION TO TRAFFIC ENGINEERING [CO-1]
Traffic Engineering Administration and functions. The road user and vehicle [8Hrs]

UNIT II: TRAFFIC SURVEY AND STUDIES [CO-2]
Spot speed study, travel time study traffic volume study, origin and destination study parking study, accident study. [8Hrs]

UNIT III: TRAFFIC CONTROL AND REGULATION [CO-3]
Road markings , traffic signs, traffic signals, miscellaneous traffic control aids and street furniture , regulation of traffic. [8Hrs]

UNIT IV: STREET LIGHTING AND HIGHWAY CAPACITY [CO-4]
Need of street lighting and its arrangement, transportation system planning, highway capacity , level of service [8Hrs]

UNIT V: THEORY OF TRAFFIC FLOW [CO-5]
definitions and basic diagram of traffic flow, car following theory , queuing theory, vehicle arrivals headways and gaps. [8Hrs]

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Traffic Engineering and Transportation Planning	Dr. L. R. Kadiyali	9	Khanna Publishers
2	Traffic engineering Hand book	Institute of Transportation Engineers	7	Prentice Hall

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Transportation engineering an introduction	Kent Lall	5	Prentice Hall
2	Principles of Transportation engineering	ChakrobortyPartha, Das Animesh	4	PHI Learning Pvt.

SCHEME OF EXAMINATION

M-Tech (Civil) with Specialization in Geotechnical Engineering

Subject Code	FEM IN GEOTECHNICAL ENGINEERING	L = 3	T = 1	P = 0	Credits =4
CE223323	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
This course will enable students to 1. Understand in general how finite elements obtain approximate solutions to differential equations. 2. Appreciate the structure of a typical finite element program. 3. Gain experience of finite element analysis applied to classical geotechnical problems	After studying this course, students will be able to: **CO-1:**To understand the basic concepts of finite element analysis in general and the transition from structural engineering aspects to geotechnical engineering aspects. **CO-2:** To understand the finite element techniques for seepage analysis and joint rock masses. **CO-3:** In Finite element applications in design and Analysis of bearing capacity of the soil for shallow foundations.

UNIT I: **CO1**

Basic concept, process of discretization, principles and laws cause and effect, Global and local coordinates, different interpolation. **[8Hrs]**

UNIT- II: **CO1**

Requirement for approximation function, Stress strain relation, Principle of minimum potential energy, integration **[8Hrs]**

UNIT- III: **CO1**

Potential energy approach, Direct stiffness method, Boundary conditions, Computer implementation. **[8Hrs]**

UNIT- IV: **CO2**

Stress distribution and deformation in isotropic and anisotropic soils, Built-up embankments, Seepage through porous media. **[8Hrs]**

UNIT- V: **CO3**

Sequenceconstruction and excavation problems.Analysis of foundation, Dams underground structures and earth retaining structures.Analysis of flow through dams and foundation.**[8Hrs]**

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Subject Code	FEM IN GEOTECHNICAL ENGINEERING	L = 3	T = 1	P = 0	Credits =4
CE223323	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Text Books:

S. No.	Title	Authors	Edition	Publisher
1	Introduction to FEM, A Numerical Method for Engineering	Desai C.S. and Abel	Third	Van Nostrand Reinhold Company
2	Introduction to the Finite Element Method	J. N. Reddy -	second	McGraw-Hill Publishers

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Finite element analysis: Theory and programming	Krishna Murthy, C. S.	Tenth	McGraw Hill Book Co., New York, 1974
2	Finite element Methods	Zienkiewicz, O. C.	fourth	McGraw-Hill Publishers