Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Scheme of Instructions : Second Year B. Tech. in Civil Engineering

Semester – III

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	HSMC	CE2301	Values and Ethics	1	-	-	1	1	-	-	50	50	100
2	BSC	CE2302	Mathematics – III	3	-	-	3	3	15	15	10	60	100
3	ESC	CE2303	Fluid Mechanics	3	0	0	3	3	15	15	10	60	100
4	ESC	CE2304	Geoscience	3	0	0	3	3	15	15	10	60	100
5	PCC	CE2305	Mechanics of Materials	3	0	0	3	3	15	15	10	60	100
6	PCC	CE2306	Surveying	3	0	0	3	3	15	15	10	60	100
7	ESC	CE2307	Fluid Mechanics Lab	0	0	2	2	1	0	0	25	00	25
8	ESC	CE2308	Geo science Lab	0	0	2	2	1	0	0	50	00	50
9	PCC	CE2309	Mechanics of Materials Lab	0	0	2	2	1	0	0	25	25	50
10	PCC	CE2310	Surveying Lab	0	0	2	2	1	0	0	25	25	50
11	P/S/CE	CE2311	Industrial Training	0	1	0	1	Audit	-	-	-	25	25
			Total	**16**	**01**	**08**	**25**	**20**	**75**	**75**	**225**	**425**	**800**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	01	03	08	08	--	--	--	--
Cumulative Sum	04	21	24	08	--	--	--	--

PROGRESSIVE TOTAL CREDITS : 37+20 =57

Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Scheme of Instructions : Second Year B. Tech. in Civil Engineering

Semester – IV

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs /Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	OEC	CE2401	Object Oriented Programming (Open Elective I)	3	-	-	3	3	15	15	10	60	100
2	ESC	CE2402	Structural Mechanics	3	0	0	3	3	15	15	10	60	100
3	PCC	CE2403	Building Planning and Design	3	0	0	3	3	15	15	10	60	100
4	PCC	CE2404	Geotechnical Engineering	3	0	0	3	3	15	15	10	60	100
5	PCC	CE2405	Concrete Technology	3	0	0	3	3	15	15	10	60	100
6	OEC	CE2406	Object Oriented Programming Lab (Open Elective I Lab)	-	-	2	2	1	-	-	25	25	50
7	PCC	CE2407	Geotechnical Engineering Lab	0	0	2	2	1	0	0	25	25	50
8	PCC	CE2408	Concrete Technology Lab	0	0	2	2	1	0	0	25	25	50
9	PCC	CE2409	Building Planning and Design Lab	0	0	2	2	1	0	0	25	25	50
10	MCC	CE2410	Environmental Science	2	-	-	2	Audit	-	-	-	-	-
11	HSMC	CE2411	Management for Civil Engineering.	1	0	0	1	1	15	15	10	60	100
			Total	**18**	**00**	**08**	**26**	**20**	**90**	**90**	**160**	**460**	**800**

 # Every Student will undergo Industrial Training of Two weeks (Minimum) in summer vacation after B. Tech. IV Sem. Examinations.

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	01	--	03	12	--	04	Yes	--
Cumulative Sum	05	21	27	19	--	04	Yes	--

PROGRESSIVE TOTAL CREDITS : 57+20 =77

Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Scheme of Instructions : Third Year B. Tech. in Civil Engineering

Semester – V

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	OEC	CE2501	Open Elective II	3	-	-	3	3	15	15	10	60	100
2	PCC	CE2502	Design of steel structure	3	0	0	3	3	15	15	10	60	100
3	PCC	CE2503	Foundation Engineering	3	0	0	3	3	15	15	10	60	100
4	PCC	CE2504	Water resources Engineering	3	0	0	3	3	15	15	10	60	100
5	PCC	CE2505	Transportation Engineering	3	0	0	3	3	15	15	10	60	100
6	PEC	CE25*6	Elective I	3	0	0	3	3	15	15	10	60	100
7	PCC	CE2508	Transportation Engineering Lab	0	0	2	2	1	0	0	25	25	50
8	P/S/CE	CE2510	Mini Project	-	-	2	2	1	-	-	25	25	50
9	P/S/CE	CE2511	Industrial Training	-	1	-	1	1			50	-	50
			Total	**15**	**01**	**10**	**26**	**21**	**75**	**75**	**250**	**400**	**800**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	--	--	--	13	03	03	--	02
Cumulative Sum	05	21	27	32	03	07	Yes	02

PROGRESSIVE TOTAL CREDITS : 77+21= 98

Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Scheme of Instructions : Third Year B. Tech. in Civil Engineering

Semester – VI

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	HSMC	CE2601	Economics for Engineers	2	-	-	2	2	15	15	10	60	100
2	OEC	CE2602	Open Elective III	2	-	-	2	2	15	15	10	60	100
3	PEC	CE26*3	Elective – II	3	-	-	3	3	15	15	10	60	100
4	PCC	CE2604	Limit State Design of Concrete Structures	3	0	0	3	3	15	15	10	60	100
5	PCC	CE2605	Quantity Surveying and Valuation	3	0	0	3	3	15	15	10	60	100
6	PCC	CE2606	Environmental Engineering	3	-	-	3	3	15	15	10	60	100
7	PCC	CE2608	Structural design and drawing I Lab	0	0	2	2	1	0	0	25	25	50
8	PCC	CE2609	Quantity Surveying and Valuation Lab	0	0	2	2	1	0	0	25	25	50
9	PCC	CE2610	Environmental Engineering Lab	0	0	2	2	1	0	0	25	25	50
10	HSMC	CE2611	Technical Presentation	-	1	-	1	1	-	-	50	-	50
11													
			Total	**15**	**01**	**08**	**24**	**20**	**75**	**75**	**275**	**375**	**800**

 # Every Student will undergo Industrial Training of Two weeks (Minimum) in summer vacation after B. Tech. VI Sem. Examinations.

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	03	--	--	12	03	02	--	--
Cumulative Sum	08	21	27	44	06	09	Yes	02

PROGRESSIVE TOTAL CREDITS : 98+20=118

Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Scheme of Instructions : Final Year B. Tech. in Civil Engineering

Semester – VII

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	OEC	CE2701	Open Elective IV	3	-	-	3	3	15	15	10	60	100
2	PEC	CE27*2	Elective- III	3	0	0	3	3	15	15	10	60	100
3	PEC	CE27*3	Elective IV (*Earthquake resistant design of structures*)	3	0	0	3	3	15	15	10	60	100
4	PCC	CE2704	Design of RCC and pre-stressed Concrete structures	3	0	0	3	3	15	15	10	60	100
5	PCC	CE2705	Hydraulic Structures	3	-	-	3	3	15	15	10	60	100
6	OEC	CE2706	Open Elective IV Lab	-	-	2	2	1	-	-	25	-	25
7	PEC	CE27*7	Elective – III Lab	-	-	2	2	1	-	-	25	-	25
8	PCC	CE2708	Structural design and drawing II	0	0	4	4	2	0	0	25	25	50
	P/S/IT	CE2709	Seminar	-	1	-	1	1	-	-	25	25	50
10	P/S/IT	CE2710	Industrial Training	-	1	-	1	1	-	-	50	-	50
11	HSMC	CE2711	Construction Management	3	0	0	3	3	15	15	10	60	100
			Total	**18**	**02**	**08**	**28**	**24**	**90**	**90**	**235**	**435**	**850**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	03	--	--	08	07	04	--	02
Cumulative Sum	11	21	27	52	13	13	Yes	04

PROGRESSIVE TOTAL CREDITS : 118+24 = 142

Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Scheme of Instructions : Final Year B. Tech. in Civil Engineering (ACADEMIC MODE)

Semester – VIII

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	OEC	CE2801	Open Elective V	3	-	-	3	3	15	15	10	60	100
2	PEC	CE28*2	Elective – V	3	-	-	3	3	15	15	10	60	100
3	OEC	CE2803	Open Elective V Lab	-	-	2	2	1	-	-	50	-	50
4	PCC	CE2804	Civil Engineering Software Lab	-	-	2	2	1	-	-	50	50	100
5	P/S/CE	CE2805	Project	-	-	20	20	10	-	-	200	200	400
			Total	**06**	**00**	**24**	**30**	**18**	**30**	**30**	**320**	**370**	**750**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	--	--	--	01	03	04	--	10
Cumulative Sum	11	21	27	53	16	17	Yes	14

PROGRESSIVE TOTAL CREDITS : 142+18= 160

Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Scheme of Instructions : Final Year B. Tech. in Civil Engineering (INDUSTRY MODE)

Semester – VIII

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	MOOC	CE2802	(MOOC – 1)	-	-	-	-	4	-	-	-	-	-
2	MOOC	CE2803	(MOOC – 2)	-	-	-	-	4	-	-	-	-	-
3	P/S/CE	CE2807	Project	-	-	-	-	10	-	-	200	200	400
			Total	**00**	**00**	**00**	**00**	**18**	**00**	**00**	**200**	**200**	**400**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training	MOOC
Credits	--	--	--	--	--	--	--	10	08
Cumulative Sum	11	21	27	52	13	13	Yes	14	08

PROGRESSIVE TOTAL CREDITS : 142+18= 160

Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

List of open elective subject:

1) **ETC:** Microprocessor and Microcontroller
2) **IT:** Object Oriented Programming
3) **Electrical:** Embedded Systems
4) **Mechanical:** Robotics and Automation
5) **CE:** Internet of Things

List of Elective subject:

Elective-I	Elective-II	Elective-III	Elective-IV	Elective-V
CE2516:	**CE2613:**	**CE2712:**	**CE2713:**	**CE2812:**
CE2526:	**CE2623:**	**CE2722:**	**CE2723:**	**CE2822:**
CE2536:	**CE2633:**	**CE2732:**	**CE2733:**	**CE2832:**
CE2546:	**CE2643:**	**CE2742:**	**CE2743:**	**CE2842:**
CE2556:	**CE2653:**	**CE2752:**	**CE2753:**	**CE2852:**
CE2566:	**CE2663:**	**CE2762:**	**CE2763:**	**CE2862:**
CE2576:	**CE2673:**	**CE2772:**	**CE2773:**	**CE2872:**

Government College of Engineering, Karad

Second Year (Sem – III) B. Tech. Civil Engineering

CE2301 : Values and Ethics

Teaching Scheme			Examination Scheme	
Lectures	01 Hrs/week		CT – 1	15
Tutorials	00 Hrs/week		CT – 2	15
Total Credits	01		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

Students will be able to:

1.	Identify basic universal human values
2.	Outline various types of rights and ethical conducts.
3.	Exhibit correct moral ethical behaviour.

	Course Contents	Hours
Unit 1	**Human Values:** Morals Values Ethics, Integrity, Work ethics, Service learning, Virtues, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Challenges in the work place Spirituality	**(02)**
Unit 2	**Engineering Ethics:** Overview, Senses of engineering ethics, Variety of moral issues, Types of inquiries, Moral dilemma, Moral autonomy, Moral development (theories), Consensus and controversy, Profession, Models of professional roles, Responsibility ,Theories about right action (Ethical theories),Self-control, Self-interest, Customs, Religion, Self-respect.	**(02)**
Unit 3	**Engineering as Social Experimentation:** Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, Industrial standards A balanced outlook on law. Safety, Responsibilities and Rights: Safety definition Safety and risk, Risk analysis, Assessment of safety and risk, Safe exit, Risk-benefit analysis, Collegiality and loyalty, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, Human rights, Employee rights, (**Self-study:** The challenger)	**(03)**
Unit 4	**Moral Reasoning and Moral Frameworks:** Moral Choices and Ethical Dilemmas, Steps in Resolving Ethical Dilemmas, Right-Wrong or Better-Worse? Moral Decision Making as Design Rights Ethics, Duty Ethics, Utilitarianism, Virtue Ethics, Self-Realization Ethics, Ethical Egoism, Best Ethical Theory	**(02)**
Unit 5	**Global Issues:** Globalization, Multinational corporations, Environmental ethics, Computer ethics, Weapons development, Engineers as managers, Consulting engineers, Engineer as expert witness, Engineers as advisors in planning and policy making, Moral leadership, Codes of ethics	**(02)**

Text Books

1.	R.S Naagarazan, "Professional Ethics and Human Values", New Age International (P) Limited Publishers **(Unit:1, 2, 3 & 5)**
2.	Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996. **(Unit: 4)**

Reference Books

1.	A.N. Tripathy, 2003," Human Values", New Age International Publishers.
2.	M Govindrajan, S Natrajan, V. S Senthil kumar,"Engineering Ethics (including Human Values)", Eastern Economy Edition, Prentice Hall of India Ltd.
3.	William. K. Frankena, "Ethics", Prentice-Hall of India, Pvt. Ltd, New Delhi.

Useful Links

1.	https://nptel.ac.in/courses/109/104/109104068/ Prof. A. K. Sharma IIT Kanpur
2.	https://nptel.ac.in/courses/110105097/ IIT Kharagpur

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	-	-	-	-	-	-	-	3	-	-	-	2	-	2
CO 2	-	-	-	-	-	-	-	3	-	-	-	2	-	2
CO 3	-	-	-	-	-	-	-	3	-	-	-	2	-	2

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	3	20
Understand	10	5	3	20
Apply	-	5	4	20
Analyse	-	-	-	-
Evaluate	-	-	-	-
Create	-	-	-	-
TOTAL	15	15	10	60

Government College of Engineering, Karad

Second Year (Sem – III) B. Tech. Civil Engineering

CE2302 : Mathematics III

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		CT – 1	15
Tutorials	-		CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

1.	After successful completion of this course, Students will be able to solve field problems in engineering involving PDEs and ODEs using Laplace Transform. They can also formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.

	Course Contents	Hours
Unit 1	**Laplace Transform**: Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of Integrals by Laplace transform, solving ODEs and PDEs by Laplace Transform.	**(10)**
Unit 2	**Fourier Transform and Z-transform** Fourier sine and cosine integrals, Fourier sine transform, Fourier cosine transform Inverse Fourier transform. Z – Transform**:** Definition, Region of convergence, Properties of Z-Transform, Inverse Z-Transform.	**(10)**
Unit 3	**Basic Statistics:** Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these threedistributions, Correlation and regression – Rank correlation	**(8)**
Unit 4	**Applied Statistics:** Curve fitting by the method of least squares- fitting of straight lines, second degree parabolasAnd more general curves. Test of significance: Large sample test for single proportion,difference of proportions, single mean, difference of means, and difference of standardDeviations.	**(8)**
Unit 5	**Statistical Tests for Small samples:** Test for single mean, difference of means and correlation coefficients, test for ratio of Variances - Chi-square test for goodness of fit and independence of attributes.	**(8)**

Tutorials

Text Books

1.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2010,2016
2.	H.K.DASS “Advance Engineering Mathematics” S.Chand publications. Fifteenth revised edition 2006.
3.	S. C. Gupta “Fundamentals of Statistics”, Himalaya Publishing House ,sixth revised edition 2008.
4.	DebashisDatta “Textbook of Engineering Mathematics’’ ‘New Age International Publication. Revised second edition

Reference Books

1.	G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,Reprint, 2002.
2.	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3.	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008.
4.	Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
5.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi
6.	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

Useful Links	
1.	
2.	
3.	

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	2	2	-	-	-	-	-	-	-	-	-	-

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5		2	20
Understand	5	5	2	20
Apply	5	5	2	10
Analyse	-	5	2	-
Evaluate	-	-	2	10
Create	-	-	-	-
TOTAL	15	15	10	60

Government College of Engineering Karad.

Second Year B. Tech

CE2303: Fluid Mechanics

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Total Credits	3	**CT2**	15
		TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 min

Course Outcome (CO): Students will be able to

1	describe the basic laws, principles and phenomena in the area of fluid mechanics
2	compute values of forces and deformations in the areas of fluids properties, statics, kinematics and dynamics of fluids
3	analyze and design engineering applications involving fluid
4	select suitable method to solve examples of fluid mechanics

Course Contents

		Hours
Unit I	**Basic Concepts:** Fluid Properties: Viscosity, Newton law of viscosity, Vapour Pressure Cavitation, Surface Tension, Capillarity, Compressibility. **Fluid Statics:** Fluid Pressure: Pascal's law, Pressure variation with temperature, density and altitude. Pressure measurement devices, Hydrostatic pressure and force. Buoyancy, Metacentre, Stability of Submerged and floating bodies.	**8**
Unit II	**Fluid Kinematics:** Classification of fluid flow : Continuity equations in Cartesian coordinates, Path line, Streak line, Stream line, and Stream tube, Stream function, Velocity potential function and their relationship, Flow net.	**7**
Unit III	**Fluid Dynamics:** Surface and body forces, Euler's Equations of motion, Bernoulli's equation, Energy Principle, Venturimeter, Orifice-meter and Pitot tube, Momentum principle, Vortex Flow-Free and Forced.	**8**
Unit IV	**Flow through pipes:** Loss of head through pipes, Darcy-Wiesbatch equation, Major and Minor losses, Total energy equation, Hydraulic gradient line, Pipes in series, Equivalent pipes, Pipes in parallel, Siphon, Power transmission through pipes, Water hammer.	**7**
Unit V	**A. Laminar flow:** Reynolds's Experiment, Laminar flow through: circular pipes and parallel plates, Hagen–Poiseuille equation. **B. Turbulent flow:** Velocity distribution and Shear stresses in turbulent flow, Prandtl mixing length theory, Hydro-dynamically smooth and rough boundary, Nikuradse's Experiment, Moody's Chart.	**6**
Unit VI	**Boundary Layer Theory and Flow around Submerged Bodies:** Assumption and concept of boundary layer theory. Boundary layer thickness, Laminar and Turbulent boundary layers on a flat plate; Laminar sub-layer, Smooth and Rough boundaries, Separation and it's control, Stokes law, Concept of Drag and Lift.	**6**

Text Books :

1	Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
2	Fluid Mechanics –Hydraulic & Hydraulic Mechanics -Modi / Seth –Standard book House, Delhi, (Edition 2010)
3	Fluid Mechanics with Engineering Applications, R.L. Daugherty, J.B. Franzini and E.J. Finnemore, International Student Edition, Mc Graw Hill.
4	Fluid Mechanics –S. Nagrathanam –Khanna Pub., Delhi, (Edition 2012)
5	Elementary Fluid Mechanics –H. Rouse –Toppan C. Ltd. Tokyo, (Edition 2010)
6	Fluid Mechanics –Garde-Mirajgaonkar –Nemchand & Bros., Roorkee, (Edition 2004)

7	Fluid Mechanics –Shames -McGraw-Hill International Book Co., Auckland, (Edition 2009)
8	Fluid Mechanics –S. Ranmamurtham, Dhanpat Rai & sons, New Delhi,(Edition 2009)
9	Fluid Mechanics and Hydraulic Machines –Dr. R.K.Bansal, Laxmi Publications, New Delhi, (Edition 2013)
Reference Books:	
1	Fluid Mechanics and Machinery, C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
2	Fluid Mechanics –Streeter and Wylie, McGraw-Hill International Book Co., Auckland, (Edition 2000)
3	Fluid mechanics –John F. Douglas et.al.,Pearson Education Co., Delhi (International Edition)(Edition 2002)
4	Fluid Mechanics (SI Version) –Fox, Mc Donald and Pritchard, Wiley India Pvt. Ltd. New Delhi, (Edition 2015)
5	Fluid Mechanics (SI Version) –Munson, Okiishi, Huebsch and Rothmayer, Wiley India Pvt. Ltd. New Delhi, (Edition 2015)
Useful Links	
1	http://www.nptel.iitm.ac.in/S.Mohan
2	www.ocw.mit.edu

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	0	2	2	0	0	0	0	0	0	0	1	1
CO 2	3	2	3	3	3	3	1	1	1	2	0	0	1	1
CO 3	3	2	2	2	3	2	0	0	1	2	1	1	1	1
CO 4	3	3	3	2	1	3	3	0	0	2	1	1	1	1

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	3	3	2	10
Understand	3	3	2	10
Apply	2	2	2	10
Analyse	3	3	1	10
Evaluate	3	3	2	10
Create	1	1	1	10
TOTAL	15	15	10	60

Government College of Engineering, Karad

Second Year (Sem – III) B. Tech. Civil Engineering

CE2304: Geoscience

Teaching Scheme			Examination Scheme	
Lectures	03Hrs/week		CT – 1	15
Tutorials			CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

Student will be able to

1.	determine Site characterization and geologic data using standards in engineering practice
2.	demonstrate The fundamentals of the engineering properties of Earth materials and fluids
3.	determine rock mass characterization and the mechanics of planar rockslides and topples.

	Course Contents	Hours
Unit 1	Importance of geological studies in various civil engineering projects. Internal structure of the Earth and use of seismic waves in understanding the interior of the earth, Concept of Continental Drift and Plate tectonics. Weathering and Erosion. Brief study of geological action of river, wind, glacier, ground water and the related landforms created by them Earthquake - Earthquake waves, Earthquake zones of India, elastic rebound theory Preventive measures for structures constructed in Earthquake prone areas.	**(08)**
Unit 2	Rock forming minerals, Megascopic identification of primary and secondary minerals Igneous Petrology- Mode of formation, Texture and structure, Classifications, study of common occurring igneous rocks Concordant and Discordant modes of occurrence of Igneous rocks.. Sedimentary Petrology - Mode of formation, Textures, structure, classification and study of commonly occurring sedimentary rocks. Metamorphic Petrology - Mode of formation, agents and types of metamorphism, structures and textures of metamorphic rocks, classification and study of commonly occurring metamorphic rocks.	**(08)**
Unit 3	Structural elements of rocks, dip, strike, outcrop patterns unconformities, outliers and inliers, Study of joints, Faults and folds, importance of structural elements in engineering operations.	**(06)**
Unit 4	Preliminary Geological Investigation and their importance to achieve safety and economy of the projects supporting dams and tunnel projects. Core Drilling - Geological logging, Inclined Drill holes. Electrical Resistivity method, Seismic method and their applications. favourable and unfavourable conditions for locating dam sites. Precautions over the unfavourable geological structures like faults, dykes , joints, unfavourable dips on dam sites and giving treatments, structural and erosional valleys. Case Histories Geological conditions suitable and unsuitable for reservoir site. Conditions likely to cause leakage through reservoir rims. Case Studies safe and unsafe geological and structural conditions, Difficulties during tunnelling and methods to overcome the difficulties. Case Studies.	**(10)**
Unit 5	Sources, zones, water table, unconfined and Perched water tables. Factors controlling water bearing capacity of rocks, Pervious and Impervious rocks, Cone of depression and its use in Civil engineering. Geological work of groundwater, Artesian well.	**(08)**
Unit 6	Types, causes and preventive measures for landslides, Stability of Slopes. Landslides in Deccan region (Western Ghats) and Himalaya. Case Studies. Requirements of good building stones and its geological factors, controlling properties, consideration of common rocks as building stones. Rock Mass classification and Rating (RMR) and Rock Quality Designation (RQD).	**(06)**

Tutorials

Text Books

1.	Text book of Engineering and General Geology by Parbin Singh, S. K. Kataria and Sons.
2.	Text Book of Engineering Geology, N. ChennaKesavulu, 2nd Edition (2009), Macmillan Publishers India.
3.	

Reference Books				
1.	Groundwater Hydrology by Todd, D. K., John wiley and sons, New York			
2.	Structural Geology by Billings, M. P., Prentice Hall of India Pvt Ltd			
3.	Principles of Petrology by Tyrell, G. W., B.I Publications			
4.	Geology for Geotechnical Engineers, J.C.Harvey, Cambridge University Press (1982).			
5.				
Useful Links				
1.	https://swayam.gov.in/nd1_noc20_ce19/preview			
2.				
3.				

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2	2	0	1	0	0	0	0	0	0	0	0	1	0
CO 2	2	2	1	0	0	0	0	0	0	0	0	0	1	0
CO 3	2	2	2	2	0	0	0	0	0	0	0	0	0	1
CO 4	2	2	1	1	0	0	0	0	0	0	0	0	1	0

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5		2	20
Understand	5	5	2	20
Apply	5	5	2	15
Analyse		5	2	15
Evaluate			2	
Create				
TOTAL	15	15	10	60

Government College of Engineering, Karad

Second Year (Sem – III) B. Tech. Civil Engineering

CE 2305 : Mechanics of Materials

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		CT – 1	15
Tutorials	00 Hrs/week		CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	02Hrs 30 Min

Course Outcomes (CO)

Student will be able to

1.	remember and understand laws and principles related to material behaviour under loading.
2.	apply knowledge to solve problems in structural analyse and material testing.
3.	evaluate and compare between different materials and verify with standards.
4.	predict behaviour of materials and make necessary inferences.

	Course Contents	Hours
Unit 1	Engineering properties of different materials, St.Venant's principle, simple stress and strain, Hooke's law, elastic behaviour of the body under external actions , composite sections under axial loading, temperature stresses , elastic constants , normal stresses and strains in three dimensions .	**(09)**
Unit 2	Analysis of statically determinate beams shear force and bending moment diagrams, virtual work approach for computation of shear force and bending moment.	**(09)**
Unit 3	Analysis of circular shafts subjected to torsion, power transmitted. Analysis of thin walled cylinders.	**(07)**
Unit 4	Theory of Simple Bending, Bending Stresses in beams,Pure Bending, Application of flexure Formula, Composite Beam or Flitched Beam.	**(08)**
Unit 5	Shear stress distribution in beams, Maximum Shear Stress, Average Shear Stress, Shear Stress Distribution Diagrams for various beam cross sections.	**(07)**
Unit 6	Principal stress and strain in two dimensions, Introduction to graphical method. Principal stress in beams and thin cylinders. Combined bending, torsion and axial thrust. Theories of failure.	**(08)**

Tutorials

Text Books

1.	Mechanics of Structure" (Vol. I and II) - Junnarkar S.B. and Advi, Charotar Publication.
2.	Strength of Materials - Bhavikatti S.S., New Age Publications.
3.	Strength of Materials- R.K.Rajput., S.Chand Publications.
4.	Strength of Materials – Suchita. Hirde, EP Publications
5.	Strength of Materials" -S Ramamrutham, DhanapatRai Publications.
6.	Strength of Materials" R.K.Bansal., Laxmi Publications.

Reference Books

1.	Mechanics of Materials" - Gere and Timoshenko, CBS publishers.
2.	Mechanics of Material" –F. Beer and R. Johnston, Mc-Graw Hill, Higher
3.	Education.
4.	Mechanics of Material, SI version- Timothy A. Philpot. Wiley publication.

Useful Links

1.	http://www.nptel.iitm.ac.in
2.	www.ocw.mit.edu

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2	2	1	1			1	1		1	1	1	3	3
CO 2	2	3	1	2	1			1			3	2	3	3
CO 3	1	2	2	2	2					1	2	2	3	3
CO 4		1	2	1	2	1	1	2	2	3	2	3	3	3

Assessment Pattern **(with revised Bloom's Taxonomy)**

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	2	2	-	8
Understand	5	5	3	20
Apply	3	3	2	12
Analyse	3	3	3	12
Evaluate	2	2	2	8
Create	-	-	-	
TOTAL	15	15	10	60

Government College of Engineering, Karad				
Second Year (Sem – III) B. Tech. Civil Engineering				
CE 2306 : Surveying				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		CT – 1	15
Tutorial	-		CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

The Student will be able to

1.	Measure distances, angles and bearings with various surveying methods and instruments.
2.	Apply knowledge of total station in triangulation and traversing.
3.	Solve surveying problems using plane table and also application of contouring
4.	Demonstrate use of tacheometry, photogrammetry ,GPS and curves in surveying

	Course Contents	Hours
Unit 1	Introduction; Types of surveys - chaining, taping, electrical distance measurement, corrections; Angle and direction measurements	**(06)**
Unit 2	Prismatic compass - measurement of bearing, computations of angles from bearings;	**(07)**
Unit 3	Total station surveying - adjustments, triangulation measurements, traversing	**(06)**
Unit 4	Principle of leveling - simple and differential levelling, adjustments Plane table surveying - different methods, two and three point problems; Contouring	**(06)**
Unit 5	Stadia tacheometry, Different types of tacheometric measurements Introduction to GPS; Introduction to photogrammetric surveying;	**(06)**
Unit 6	Curves.	**(05)**

Text Books

1.	Surveying and Levelling Vol. I and II - T.P Kanetkar and S.V. Kulkarni, Pune Vidhyarthi Griha Prakashan. (Edition 2008)
2.	Surveying Vol., I, II and III - Dr. B.C. Punmia, Laxmi Publishers, New Delhi. (Edition 2005)
3.	Surveying Vol., I and II - S. K. Duggal, Tata McGraw Hill, New Delhi. (Edition 2007)

Reference Books

1.	Surveying and Levelling - R. Agor, Khanna Publishers, New Delhi (Edition 2000)
2.	Surveying and Levelling - N.N. Basak, Tata Mcgraw Hill, New Delhi. (Edition 2014)
3.	Surveying Vol., I, II and III - Dr. K.R. Arora, Standard Book House, New Delhi. (Edition 2001)
4.	Plane surveying – David Clark. (Edition 2001)
5.	

Useful Links

1.	http://www.nptel.iitk.ac.in/BharatLohani
2.	www.ocw.mit.edu
3.	http://www.nptel.iitr.ac.in/S.K.Ghosh

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	1	1	0	0	1	0	0	0	3	0	0	1		
CO 2	2	2	2	1	3	0	0	0	3	1	1	1		
CO 3	2	2	2	1	3	0	0	0	3	2	1	0		
CO 4	1	1	2	0	0	0	0	0	3	0	0	0		

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyse	3	3	2	12

Evaluate	3	3	2	12
Create	3	3	2	12
TOTAL	15	15	10	60

Government College of Engineering Karad			
Second Year B. Tech			
CE2307: Fluid Mechanics Laboratory			
Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
Total Credits	1	**ESE**	-
		Total	25

Course Objectives:

	Student will be able to
1	demonstrate measurement of fluid pressure in pipe flow and in open channel flow
2	demonstrate an ability to measure discharge and losses in pipe flow
3	demonstrate an ability to verify stability of floating body and Bernoulli's Theorem
4	demonstrate an ability to determine flow parameters in open channel flow

Course Contents

At least EIGHT experiments from the following

Experiment 1	Determination of metacentric height of Floating Body
Experiment 2	Verification of Bernoulli's Theorem
Experiment 3	Determination of coefficient of discharge of Venturimeter / orifice meter/ orifice
Experiment 4	Measurement of discharge using mouthpiece.
Experiment 5	Study of factors affecting coefficient of friction for pipe flow (at least for two different materials and two different diameters)
Experiment 6	Determination of loss of head due to i) Sudden expansion, ii) contraction iii) elbow iv) bend v) Globe Valve etc. (At least Two minor losses)
Experiment 7	Determination of Chezy's and Manning's constants
Experiment 8	Calibration of notches and Weirs
Experiment 9	Study of Impact of jet
Experiment 10	Visualization of Laminar and Turbulent flow using Reynold's Apparatus and determination its sample value

List of Submission:

1	Total number of Practical

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	0	2	2	0	0	0	0	0	0	0	1	1
CO 2	3	2	3	3	3	3	1	1	1	2	0	0	1	1
CO 3	3	2	2	2	3	2	0	0	1	2	1	1	1	1
CO 4	3	3	3	2	1	3	3	0	0	2	1	1	1	1

Government College of Engineering, Karad				
Second Year (Sem – III) B. Tech. Civil Engineering				
CE 2308 : Geoscience Lab				
Teaching Scheme			**Examination Scheme**	
Experiments	02 Hrs/week			
Tutorials				
Total Credits	01		CA	50

Course Outcomes (CO)

Student will be able to

1.	Determine the types of minerals and rocks.
2.	Create subsurface map based on outcrop map
3.	Determine the rock quality based on computation of RQD

Course Contents

Exp. 1	Study of physical properties of the minerals and Identification of minerals (Rock forming minerals and Ore Minerals)
Exp. 2	Identification of rocks Igneous Rocks like Granite and its varieties, Syenite, Pegmatite, Basalt and its varieties, Gabbro, Dolerite, Pumice etc. Sedimentary Rocks like Conglomerate, Breccia, Sandstone and its varieties, Shales, Limestones, Laterites. Metamorphic Rocks like Mica Schists, Hornblende Schists, Slate, Phyllite, Granite Gneiss, Augen gneiss, Marbles and Quartzite.
Exp. 3	Study of Geological maps and profiles. Three point and Dip and strike problems.
Exp. 4	To Solve Rock Mass Rating(RMR) and RQD problems
Exp. 5	Study tour to the places of Engineering geological importance

Tutorials

Text Books

1.	Text book of Engineering and General Geology by Parbin Singh, S. K. Kataria and Sons.
2.	Text Book of Engineering Geology, N. Chenna Kesavulu, 2nd Edition (2009), Macmillan Publishers India.
3.	Rutley's Elements of Mineralogy by Read, H. H., CBS Publishers

Reference Books

1.	Groundwater Hydrology by Todd, D. K., John wiley and sons, New York
2.	Structural Geology by Billings, M. P., Prentice Hall of India Pvt Ltd
3.	Principles of Petrology by Tyrell, G. W., B.I Publications
4.	Geology for Geotechnical Engineers, J.C.Harvey, Cambridge University Press (1982).
5.	Laboratory Manual of Geology by Sen, A. K., Modern Book Agency Pvt Ltd Kolkata

Useful Links

1.	http://vlabs.iitb.ac.in/vlabs-dev/labs/nitk_labs/geology-lab/experimentlist.html
2.	
3.	

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	0	2	0	0	0	0	0	0	0	0	1	0
CO 2	3	2	3	3	0	0	0	0	0	0	0	0	0	0
CO 3	3	2	2	2	0	0	0	0	0	0	0	0	0	0
CO 4	3	3	3	2	0	0	0	0	0	0	0	0	0	0

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember			10	
Understand			10	
Apply			10	
Analyse			10	
Evaluate			10	
Create				
TOTAL			50	

Government College of Engineering, Karad					
Second Year (Sem – III) B. Tech. Civil Engineering					
CE 2309 : Mechanics of Materials Lab					
Teaching Scheme			**Examination Scheme**		
Practicals	02 Hrs/week		TA/CA	25	
Total Credits	01		ESE	25	
			Total	50	
Course Outcomes (CO)					
Student will be able to					
1.	demonstrate the testing on the different materials to find its physical, mechanical properties as per the IS code.				
2.	conclude behaviour of the material from experimental data and represent in the standard format.				
	Course Contents				
Experiment 1	Study of Universal Testing Machine.				
Experiment 2	Water absorption test and compression test on burnt clay bricks.				
Experiment 3	Compression test on timber.				
Experiment 4	Tensile test on Mild steel bar and TMT steel bar				
Experiment 5	Bending test on Mild steel bar and Timber Beam				
Experiment 6	Direct shear test on Mild steel bar.				
Experiment 7	Hardness test on different metals such as Iron, Copper, Bronze and Aluminium.				
Experiment 8	Torsion test on Mild steel bar				
Experiment 9	Flexure test on flooring tiles.				
Experiment 10	Izod Impact test on metal specimens				
List of Submission					
	Total number of Experiments				

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	1	3	3	2	1	2	1	2		2	3	3
CO 2	2	2	1	2	2	2	1	2	1	3		2	3	3

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CA	ESE
Remember	3	3
Understand	6	6
Apply	6	6
Analyse	6	6
Evaluate	4	4
Create	-	
TOTAL	25	25

Government College of Engineering, Karad				
Second Year (Sem – III) B. Tech. Civil Engineering				
CE 2310 : Surveying Lab				
Teaching Scheme			**Examination Scheme**	
Practical	02 Hrs/week		CA	25
Total Credits	1		ESE	25
			Duration of ESE	30 Min

Course Outcomes (CO)

The students will be able to

1.	apply leveling techniques by using Tacheometer..
2.	Knowledge of Setting out simple curves on field..
3.	use of various modern instruments of Surveying.
4.	measure differences in elevation, draw and utilize maps.

	Course Contents	Hours
Expt.1	To determine Constants of Tacheometer.	**2 Hrs**
Expt.2	To determine linear distance and elevation by Fixed Hair Method of Tacheometer	**2 Hrs**
Expt.3	To determine area of polygon by Tacheometer.	**2 Hrs**
Expt.4	To determine gradient of line by Tacheometer.	**2 Hrs**
Expt.5	To Setting Out Simple Curve by any one method of Survey (namely, Deflection Angle Method or Rankine's Method).	**2 Hrs**
Expt.6	To Study GPS.	**2 Hrs**
Expt.7	To Study Mirror Stereoscope.	**2 Hrs**
Project 1	Road project – at least 500m /cannel alignment of at least 1km.	
Project 2	Radial contouring by Total station	
Project 3	Project work: Field Survey by GPS and GIS Software	

List of Submission

1.	Total number of Experiments
2.	Project Visit Report (any one project)

Text Books

1.	Surveying and Levelling Vol. I and II - T.P Kanetkar and S.V. Kulkarni, Pune Vidhyarthi Griha Prakashan. (Edition 2008)
2.	Surveying Vol., I, II and III - Dr. B.C. Punmia, Laxmi Publishers, New Delhi. (Edition 2005)
3.	Surveying Vol., I and II - S. K. Duggal, Tata McGraw Hill, New Delhi. (Edition 2007)

Reference Books

1.	Surveying and Levelling - R. Agor, Khanna Publishers, New Delhi (Edition 2000)
2.	Surveying and Levelling - N.N. Basak, Tata Mcgraw Hill, New Delhi. (Edition 2014)
3.	Surveying Vol., I, II and III - Dr. K.R. Arora, Standard Book House, New Delhi. (Edition 2001)
4.	Plane surveying – David Clark. (Edition 2001)
5.	

Useful Links

1.	http://www.nptel.iitk.ac.in/BharatLohani
2.	www.ocw.mit.edu
3.	http://www.nptel.iitr.ac.in/S.K.Ghosh

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	1	1	0	0	1	0	0	0	3	0	0	1		
CO 2	2	2	2	1	3	0	0	0	3	1	1	1		
CO 3	2	2	2	1	3	0	0	0	3	2	1	0		
CO 4	1	1	2	0	0	0	0	0	3	0	0	0		

Government College of Engineering, Karad

Second Year (Sem – III) B. Tech. Civil Engineering

CE2311: Industrial Training

Teaching Scheme			Examination Scheme	
Lectures				
Tutorials	1 Hrs/Week		ESE	25
Total Credits	Audit			

Course Outcomes (CO)

Students will be able to

1.	Comprehend the knowledge gained in the course work.
2.	Get familiarized to an industrial environment.
3.	Understand the importance of presentations and their inherent problems and Identify the audience, purpose, organization, flow, style, and delivery of presentations.

Course Contents	Hours
Student is supposed to present technical report on the industrial training or civil engineering related in-house training of not less than fifteen days completed during summer vacation. The student will be assessed for the technical knowledge he/she has gained during training period. The Report Should Consist: 1. Introduction and Brief History of the Organization 2. Technical and Practical information gained during the summer training period. 3. Daily Work Progress Report 4. Necessary certificate from the organization where such training is undertaken 5. Conclusion and Recommendations, Photo gallery, References, Appendices.	

Tutorials

Text Books

1.	Brian Tracy; How to Present With Power in Any Situation, McGraw-Hill Publication

Reference Books

1.	Garr Reynolds; Presentation Zen, Simple Ideas on Presentation Design and Delivery; New Riders publication, 2nd Edition

Useful Links

1.	http://buildingpublicunderstanding.org/assets/files/presentationzen.pdf

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE2401 : Object Oriented Programming (Open Elective I)

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		CT – 1	15
Tutorials			CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

Students will be able to

1.	Describe basics of C++ and characteristics of Object oriented programming languages
2.	Apply various concept of OOP like class, object, inheritance polymorphism, dynamic binding etc
3.	Explain advance features of C++ Language
4.	

	Course Contents	Hours
Unit 1	Object Oriented Programming Object Oriented Programming Paradigm, Concepts of object-oriented programming. Applications of OOP. Beginning with C++: simple program and its structure, Basic Types, variables, constants, storage class, operators, expression, control statements, loop statements, functions, inline function, Array, string, pointers, structure	**(07)**
Unit 2	Classes and Objects Defining Class, data members, member functions, Access specifiers – public, private, protected, constructor, parameterized constructor, destructor, array of objects, passing objects to functions, returning object.	**(05)**
Unit 3	Inheritance Need of Inheritance, Concept, public, private, protected inheritance, Single inheritance, Multiple and multilevel inheritance, Abstract class, Hybrid Inheritance, Virtual base class, overriding of member functions, static variable, static function, friend function, friend class.	**(06)**
Unit 4	Pointers and Polymorphism Pointers basics of memory management, New and delete operators, Pointer to object, Pointer to data members, this pointer. Need of Polymorphism, concept, Compile time polymorphism or early binding: function over loading and operator overloading, overloading - unary, binary, arithmetic operators, relational operators, overloading new and delete operators, insertion and extraction operators, run time polymorphism or late binding using Virtual function, pure virtual function.	**(08)**
Unit 5	Files and Streams Concept of Streams, concept of File, opening and closing a file, detecting end-of-file, file modes, file pointer, reading and writing characters, strings and objects to the file, operations to move file pointers i.e seekg, seekp, tellg, tellp.	**(05)**
Unit 6	Advanced C++ features Exception handling: Introduction, syntax for exception handling code: try-catch-throw, Multiple Exceptions, Exceptions with arguments, (Self-Study: Templates: Function template and class template, Standard Template Library (STL), containers, iterators and algorithms	**(05)**

Tutorials

Text Books

1.	R. Lafore, “Object Oriented Programming in C++”, Galgotia Publications, 3rd Edition (Unit:1-6)
2.	E Balguruswamy, “Object Oriented Programming with C++”,McGraw-Hill publication, 4thEdition (Unit:1-6)

Reference Books

1.	Bjarne Stroustrup, “C++ Programming with language”, AT & T
2.	Herbert Schildt, “C++: The Complete Reference”, McGraw-Hill, 4th Edition

Useful Links

1.	http://www.spoken-tutorial.org NMEICT Project of Govt. Of India.
2.	http://nptel.ac.in/courses/106106127/41 Prof. Shankar Balachandran, IITMadras

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE 2402 : Structural Mechanics

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		CT – 1	15
Tutorials			CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	03 Hrs

Course Outcomes (CO)

Student will be able to

1.	remember and understand laws and principles related to material behaviour under loading.
2.	apply methods to solve problems in structural analysis.
3.	assess values of reactive parameters in structures under different loading conditions.
4.	predict behaviour of structures and make necessary inferences required for design.

	Course Contents	Hours
Unit 1	Combined direct and bending stresses, eccentric loads, stability analysis of gravity dams, retaining walls and chimneys. Analysis of long columns, Euler's and Rankine's theory.	**(07)**
Unit 2	Slope and deflection method for determinate beams - double integration method, Macaulay's method, moment-area method and conjugate beam method.	**(07)**
Unit 3	Influence line diagrams for determinate compound beams and trusses. Rolling load on simply supported beams.	**(07)**
Unit 4	Strain energy stored due to axial loading – strain energy stored due to bending- work done by a force on an member-Law of Reciprocal Deflections—Betti's law - the first theorem of Castigliano-deflection of truss joints	**(08)**
Unit 5	Concept of determinacy and indeterminacy, Degrees of freedom and structural redundancy, Methods of analysis. Consistent deformation method: propped cantilever with uniform section, fixed beam, portal frame.	**(06)**
Unit 6	Force method: Clapeyeron's theorem of three moments in continuous beam, sinking of support, beam with different flexural rigidity. Analysis of three hinged arches.	**(07)**

Tutorials

*Minimum Six Tutorials should be taken in tutorials hours

Text Books

1.	"Mechanics of Structure" (Vol. I & II), By Junnarkar S.B. and Advi, Charotar publication , Second edition, 1957, ISBN 8185594678.
2.	"Mechanics of Materials" Vol. I & II by B.C. Punmia, Jain, Laxmi Publications, Edition 2016, ISBN- 8131806454.
3.	"Structural Mechanics", by S. K. Hirde, Manoj Hedaoo, Techmax Publication. First edition, 2014.

Reference Books

1.	"Mechanics of Materials" by Gere and Timoshenko, CBS publishers, edition 2006, ISBN 8123908946.
2.	"Strength of Material" by F. L. Singer and Pytel, Fourth edition,1987. Harper Collins, New Delhi.
3.	"Mechanics of Material" by Beer and Johnston, Sixth edition 2015, DeWolf, Mazurek.
4.	Introduction to Mechanics of Solids" by E.P. Popov, edition 1990 , Prentice hall publications .
5.	"Mechanics of Materials" by R.C. Hibbler, Edition 2016 Pearson Education.
6.	"Theory of Structures" by Dr. S. K. Hirde , Dr. Manoj Hedaoo, Techmax Publication. First edition, 2014.

Useful Links

1.	NPTEL link: http://www.nptelvideos.in/2012/11/strength-of-materials-prof.html Prof. K. Bhattacharya.
2.	http://www.nptelvideos.in/2012/11/structural-analysis-ii.html. Prof. P. Banerjee.
3.	http://www.nptelvideos.in/2012/11/advanced-structural-analysis.html. Prof. Devdas Menon. IIT Madras

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	3	1	2		2				3		2	3	3
CO 2	2	3	1	2	3	1	1			3	1	2	3	3
CO 3	2	2	1	2		1				3	2	3	3	3
CO 4	2	2	1	2		1	2			3	2	2	3	3

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	2	2	-	8
Understand	3	3	3	8
Apply	3	3	2	12
Analyse	5	5	3	12
Evaluate	2	2	2	20
Create	-	-	-	
TOTAL	15	15	10	60

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE2403 :Building Planning and Design

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		CT – 1	15
Tutorials	-		CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

Student will able to

1.	draw the different building components and demonstrate requirements and suitability of that components.
2.	plan and design of buildings as well as its components as per SP-7
3.	Demonstrate requirements and method of application of various building services

	Course Contents	Hours
Unit 1	Components of Building Basic requirements of a building as a whole: strength and stability, Dimensional stability, comfort and convenience, damp prevention, water-proofing techniques, heat insulation, day lighting and ventilation. Building components and their uses: Foundations, plinth, walls and columns in superstructure, floors, doors and windows, sills, lintels, roofs, steps and stairs, utility fixtures. Foundations: Types and their suitability	**(06)**
Unit 2	Components of Building and designing Introduction to Stone masonry – Random Rubble, Un-coursed Rubble, Coursed Rubble and Ashlar Masonry. Brickwork and Brick Bonds - English, Flemish. Arches: Technical terms in arches, types of arches, methods of construction. Lintel: Classification, Doors and Windows: Classification, Stairs: Technical terms, types, Design of stairs, Ramps, lifts and escalator. Roofs and floor: types and their suitability	**(07)**
Unit 3	Introduction to construction, rehabilitation and Water proofing. Repairs, Maintenance and rehabilitation, Green building and its rating systems, Water proofing: materials, methods	**(05)**
Unit 4	Building Planning Site Selection criteria, Principles of Building planning. Significance Sun path diagram. Wind Diagram, Orientation, Factors affecting and criteria under Indian condition. Building Planning Byelaws and regulations as per SP-7. Planning of Residential Building (Bungalows, Row Bungalows, Apartments and Twin Bungalows) Procedure of Building Permission, significance of commencement certificates, plinth Completion certificate and occupancy certificate.	**(06)**
Unit 5	Building Services Plumbing system: Various types of traps and plumbing systems, Fittings, Chambers, Need of Septic Tank, Concept of Plumbing and Drainage plan Electrification: - Concealed and Open Wiring, Requirements and Location of various points, Concept of Earthing. Fire resistance in building: Fire protection precautions, confining of fire, fire hazards	**(06)**
Unit 6	Building Ventilation and Finishing Ventilation: requirement, various system and section criteria. Thermal Insulation: - General concept, Materials, Methods. Introduction to Acoustics: Absorption of sound, various materials, conditions for good acoustics. Sound Insulation and modern techniques of noise control Plastring- Types ,defects and Methods, Pointing- Types Paints- Ingredients and types	**(04)**

Tutorials

Text Books

1.	Building Design by Shah, Kale, Patki. Tata Mc-Graw Hill Publications. (Edition 2015)
2.	Building Design by Bindra& Arora –S.Chand.(Edition 2008)
3.	Building Construction and materials by ChowdhariDhanpatRai Publication. (Edition 2014)

Reference Books	
1.	National Building code SP-7. (Edition 2005)
2.	Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
3.	Building construction By Rangawala
4.	Building Construction by B.C Punmia, Ashok ku. Jain, Arun Kumar Jain.
5.	Building materials and construction by SS Bhavikatti.
Useful Links	
1.	https://easyengineering.net/building-materials-duggal/

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2	2	2	1	3	0	2	0	0	0	1	1	1	1
CO 2	0	1	1	1	1	0	2	0	0	0	0	1	1	1
CO 3	1	2	1	0	2	2	2	1	0	0	0	1	1	1
CO 4	2	3	2	3	3	0	2	1	0	0	1	3	1	1

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	3	3	2	10
Understand	3	3	2	10
Apply	3	3	2	10
Analyse	3	3	2	10
Evaluate	3	3	2	10
Create				
TOTAL	15	15	10	50

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE2404 : Geotechnical Engineering

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		CT – 1	15
Tutorials	00 Hrs/week		CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

Student will be able to :

1.	demonstrate properties of soil
2.	determine permeability, compaction and consolidation
3.	compute stress distribution, shear strength and earth pressure
4.	Apply knowledge of geo-environmental and geosynthetics.

	Course Contents	Hours
Unit 1	**Properties of Soil:** Introduction to Soil Mechanics, formation of soil & soil structure, three phase soil system, weight volume relationships, detail index properties of soil -methods of determination and its significance, particle size and shape, classification of soils, soil consistency, field identification of soils	**(5)**
Unit 2	**Permeability and Seepage:** Capillary water. Darcy's law, Factors affecting permeability, Determination of permeability by constant head and falling head method as per IS - 2720, field test as per IS – 5529 (part I) - pumping in test and pumping out test. Permeability of layered soils, Seepage forces, General flow equation (Laplace equation). Flow net construction and applications, Concept of effective neutral & total stress in soil mass. Quick sand condition. Uplift pressure, exit gradient, failure due to piping.	**(6)**
Unit 3	**Compaction and Consolidation** Factors affecting compaction, Dry density and moisture content relationship, Zero air voids line, Effect of compaction on soil structure, Standard Proctor test and Modified Proctor test as per IS – 2720. Field compaction equipment and methods, Field control of compaction, Spring analogy, Terzaghi's theory of one-dimensional consolidation, Determination of coefficient of consolidation-square root of time fitting method and logarithm of time fitting method, Rate of settlement, normally consolidated and over consolidated soils, Determination of pre consolidation pressure.	**(7)**
Unit 4	**Stress Distribution in Soil & Earth pressure** Boussinesq theory- point load, line load, strip load, pressure distribution diagram on a horizontal and vertical plane, pressure bulb, Westergaard's theory, equivalent point load method, Newmark chart, contact pressure, approximate stress distribution method, earth pressure at rest, active and passive condition. Rankines and Coulomb's theory of earth pressure.	**(6)**
Unit 5	**Shear Strength:** Coulomb's theory and failure envelope, Principle stress, stress analysis (Total stress approach and effective stress approach), representation of stresses on Mohr's circle for cohesive, cohesionless, saturated and partly saturated soil, Application of shear stress parameters in the field Unconsolidated undrained, consolidated undrained and consolidated drained, type of test -box shear test, triaxial compression test with pore pressure and volume change measurement, unconfined compression test, vane shear test.	**(6)**
Unit 6	**Introduction to Geo-Environmental Engineering and Geo-synthetics:** Scope, Soil-water-contaminant interaction, Waste containment system, Methods of landfill and design of landfills, Advance soil characterization, Limitations of landfills and importance of decentralized solid waste management systems, Introduction to Geosynthetic techniques and Geotextile	**(6)**
Tutorials		

Text Books

1.	Text Book of Soil Mechanics in Theory and Practice, Alam Singh, Asian Publishing House, Bombay, Edition 2008
2.	Soil Mechanics and Foundation Engineering-V. N. S. Murthy., U. B. S. Publishers and distributors New Delhi, Edition 2011
3.	Geotechnical Engineering, P. Purushottam Raj,Tata Mcgraw Hill Company Ltd. New Delhi, Edition 2012

Reference Books

1.	Soil Mechanics and Foundations, B. C. Punmia ,Laxmi Publications (P) Ltd. New Delhi, Edition 2015
2.	Soil mechanics-Terzaghi and Peak,John Willey and Sons, New-York, Edition 1994
3.	Soil Mechanics and Foundation Engineering, K.R. Arora,Standard Publishers Distributors, Delhi, Edition 2011
4.	Geotechnical Engineering, B. J. Kasamalkar,Pune Vidyarthi Griha Prakashan Pune, Edition 2010

5.	
Useful Links	
1.	http://nptel.iitm.ac.in by Prof. B. V. S. Viswanadham and Prof. G. Venkatachalam
2.	
3.	

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	0	2	2	0	0	0	0	0	0	0	2	1
CO 2	3	2	3	3	3	3	1	1	2	2	0	0	1	2
CO 3	3	2	2	2	3	2	0	0	2	2	1	1	2	1
CO 4	3	3	3	2	1	3	3	2	2	2	2	2	1	2

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	√	√	√	√
Understand	√	√	√	√
Apply	√	√	√	√
Analyse	√	√	√	√
Evaluate	√	√	√	√
Create				
TOTAL	15	15	10	60

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE 2405 : Concrete Technology

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		CT – 1	15
Tutorials	00 Hrs/week		CT – 2	15
Total Credits	03		TA	10
			ESE	60
			Duration of ESE	03 Hrs

Course Outcomes (CO)

Student will be able to

1.	remember and understand material composition, properties and IS recommendations.
2.	apply knowledge to carry out test on fresh, hardened and ingredients of concrete to interpret results.
3.	choose, compare and apply different materials and admixtures as per site conditions.
4.	design concrete mix using different standard codes.

	Course Contents	Hours
Unit 1	**Ingredients of Concrete** a) Cement: Physical properties of cement such as fineness, consistency test, Initial and final setting time, soundness, compressive strength, specific gravity. Hydration of cement, chemical compounds of cement. Grades of cement, Types of cement-Ordinary Portland, Portland pozzolana, Rapid Hardening Portland Cement, Quicksetting cement, Sulphur resisting cement, Super sulphated cement, Expansive cement, Rediset cement, High strength cement, High Alumina, Low heat, White, Coloured, Oil well, Hydrophobic cement. b) Aggregates: Physical properties such as sieve analysis and fineness modulus, specific gravity and water absorption, silt content, Bulking of sand, Bulk density, moisture content, Flakiness index, Elongation index. Mechanical properties such as Crushing, Impact and Abrasion value, Alkali –Aggregate reaction, gradingof Aggregate, Artificial and recycled aggregate. c) Water: Specifications of wateras per IS 456 –2000.	**(09)**
Unit 2	**Fresh Concrete**: Batching, Mixing, Transportation, placing of concrete including pumping and compaction techniques for good quality concrete, Workability of concrete and methods of measuring workability, Factors affecting workability, Segregation and bleeding, Curing of concrete, Different methods of curing, Temperature effects on fresh concrete. **Admixtures:** Types of admixtures, Plasticizers and super plasticizers and their effects on workability, Air entraining agents, Retarders, their effects on proportion of concrete, Pozzolanic admixtures, Fly ash, fly ash on fresh concrete, Silica flume, Metalaolim, Ground Granulated Blast Furnace Slag.	**(08)**
Unit 3	**Hardened Concrete:** Strength of concrete, w/c ratio, Gel-space ratio, Effect of maximum size of aggregate, Factors affecting strength of concrete, Characteristic strength - compressive, tensile and flexure strength, Relation between compressive & tensile strength. Modulus of elasticity, Relation between modulus of elasticity & strength, Creep and shrinkage of concrete. Test on hardened concrete – compressive strength test, flexural strength test, split tensile test, comparison of cube test and cylinder test. **Non Destructive Testing:** Schmidt's rebound hammer –Mechanical & digital, Ultrasonic pulse velocity method, techniques of measuring & factors affecting the measurement of pulse velocity, Corrosion meter, Cover meter and core cutter.	**(08)**
Unit 4	**Concrete Mix Design** Nominal Mix Concrete, Objectives of mix design, Factors governing mix design, Methods of expressing proportions, statistically quality control. Mix design , ACI 211.1-91 method, IS code method as per 10262 & 456, Mix design of fly ash concrete by using IS 10262 – 2019.	**(05)**
Unit 5	**Special Concrete** Light weight concrete, no-fines concrete, high density concrete, fiber reinforced concrete, self-compacting concrete, high strength concrete, high performance concrete, manufacturing	**(05)**

	of ready mix concrete, cold weather concreting, hot weather concreting, pavement quality concrete.	
Unit 6	**Durability Concrete:** Strength and durability relationship, effect of w/c on durability, different exposure condition as per IS 456 minimum and maximum cement content, effect of permeability, sulphate attack, methods of controlling sulphate attack. Durability of concrete in sea water,	**(05)**

Tutorials	
Text Books	
1.	"Concrete Technology" M. S. Shetty S. Chand & Company Ltd, New Delhi
2.	"Concrete Technology" M. L. GambhirTata McGraw-Hill publishing Company Ltd, New Delhi
3.	"Concrete Technology K. T. Krishnaswamy DhanpatRai Publication, New Delhi
Reference Books	
1.	"Concrete Technology" A. M. Neville Pearson Education, New Delhi
2.	"Concrete Technology" Orchard Asia publication, New Delhi
3.	"Concrete Technology" V. N. Vazirani Khanna Publication, New Delhi
4.	IS: 456, 2000, Indian Standard Plain and Reinforced Concrete.
5.	IS: 10262,2019, Recommended guidelines for Concrete Mix Design
6.	ACI 211.1-91
Useful Links	
1.	http://www.nptel.iitm.ac.in
2.	www.ocw.mit.edu
3.	www.bis.org.in

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
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CO 2	2	1	2	3	1		3	2		3	3	2	3	3
CO 3	2	2	3	1	3	2	3	2		3	3	3	3	3
CO 4	2	2	3	3	2	2	2	2		3	2	3	3	3

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	2	2	-	8
Understand	5	5	3	20
Apply	3	3	2	12
Analyse	3	3	3	12
Evaluate	2	2	2	8
Create	-	-	-	
TOTAL	15	15	10	60

Government College of Engineering, Karad				
Second Year (Sem – IV) B. Tech. Civil Engineering				
CE2406 : Object Oriented Programming Lab (Open Elective Lab)				
Teaching Scheme			**Examination Scheme**	
Practical	2 Hrs/week		CT – 1	0
Tutorials			CT – 2	0
Total Credits	01		CA	25
			ESE	25

Course Outcomes (CO)	
Students will be able to	
1.	Implement basic C++ programming concepts like inheritance, polymorphism, encapsulation etc
2.	Develop and execute program by using multiple concepts
3.	Analyze errors and program behaviour for different set of inputs.
4.	

	Course Contents
Experiment 1	Implementation of Array, string and structure
Experiment 2	Implementation of Class Objects, Constructor, destructor, constructor overloading.
Experiment 3	Implementation of Multiple and multilevel inheritance with function overriding.
Experiment 4	Implementation of Virtual base class and Virtual function
Experiment 5	Implementation of static variable and static function.
Experiment 6	Implementation of friend function and friend class
Experiment 7	Implementation of function over loading and operator overloading.
Experiment 8	Implementation of dynamic memory allocation using New and delete operators
Experiment 9	Implementation of Virtual function and pure virtual function
Experiment 10	Implementation of random access file
Experiment 11	Implementation of exception handling.

Submissions	
	Total number of Experiments : 1

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE2407 :Geotechnical Engineering Lab

Teaching Scheme			Examination Scheme	
Experiments	02 Hrs/week		CT – 1	00
Tutorials	00 Hrs/week		CT – 2	00
Total Credits	01		TA	25
			ESE	25
			Duration of ESE	01 Hrs 00 Min

Course Outcomes (CO)

Students will be able to

1.	determine index properties of the soil.
2.	compute compression, shear stress distribution, shear strength and earth pressure
3.	compute consolidation and demonstrate safe bearing capacity of soil

	Course Contents – At least eight experiment from the following	Hours
Experiment 1	Classification of soils-Fine grain and coarse grain soil	**(2)**
Experiment 2	Standard Proctor test/ Modified Proctor test	**(2)**
Experiment 3	Determination Specific gravity by pycnometer / density bottle	**(2)**
Experiment 4	Determination of consistency limits and its use in soil classification	**(2)**
Experiment 5	Field density test by core cutter, sand replacement method	**(2)**
Experiment 6	Determination of co-efficient of permeability by constant head and by variable head method.	**(2)**
Experiment 7	Direct shear test Experiment	**(2)**
Experiment 8	Unconfined compression test	**(2)**
Experiment 9	Triaxial test	**(2)**
Experiment 10	One dimensional consolidation test	**(2)**
Experiment 11	Demonstration/Determination of Safe bearing capacity of soil /Alluvial soil pressure by plate load test/Standard penetration test.	**(2)**

Tutorials

Text Books

1.	Text Book of Soil Mechanics in Theory and Practice, Alam Singh, Asian Publishing House, Bombay, Edition 2008
2.	Soil Mechanics and Foundation Engineering-V. N. S. Murthy., U. B. S. Publishers and distributors New Delhi, Edition 2011
3.	Geotechnical Engineering, P. PurushottamRaj,TataMcgraw Hill Company Ltd. New Delhi, Edition 2012

Reference Books

1.	Soil Mechanics and Foundations, B. C. Punmia ,Laxmi Publications (P) Ltd. New Delhi, Edition 2015
2.	Soil mechanics-Terzaghi and Peak,John Willey and Sons, New-York, Edition 1994
3.	Soil Mechanics and Foundation Engineering, K.R. Arora,Standard Publishers Distributors, Delhi, Edition 2011
4.	Geotechnical Engineering, B. J. Kasamalkar,Pune Vidyarthi GrihaPrakashan Pune, Edition 2010
5.	

Useful Links

1.	http://nptel.iitm.ac.in by Prof. B. V. S. Viswanadham and Prof. G. Venkatachalam
2.	
3.	

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Government College of Engineering, Karad				
Second Year (Sem – IV) B. Tech. Civil Engineering				
CE 2408 : Concrete Technology Lab				
Teaching Scheme			**Examination Scheme**	
Lectures	00 Hrs/week		TA/CA	25
Tutorials	00 Hrs/week		ESE	25
Practicals	02 Hrs/week			
Total Credits	01			

Course Outcomes (CO)

Student will be able to

1.	perform the various test on ingredients of concrete and interpret results.
2.	demonstrate tests on fresh concrete and admixture
3.	analyse destructive and NDT on hardened concrete.
4.	design concrete mix as per the various guidelines.

	Course Contents
Experiment 1	**Testing of cement**: Consistency, fineness, setting time, Specific Gravity, Soundness and strength.
Experiment 2	**Testing of fine aggregate**: Specific Gravity, sieve analysis and zoning, bulking of fine aggregate, bulk density, silt content.
Experiment 3	**Testing of coarse aggregate**: Specific Gravity, sieve analysis, bulk density, flakiness index, elongation index, water absorption & moisture content,
Experiment 4	**Concrete Mix design** by ACI 211.1-91 method, IS code method as per 10262-2009 & 456-2000
Experiment 5	**Tests on Fresh Concrete**-Workability tests –Slump cone test, compaction factor test,Vee-bee consistometer test.
Experiment 6	**Tests on Hardened Concrete**-compressive strength, flexural strength, split tensile strength.
Experiment 7	**Effects of Admixture**-Accelerator, Retarder, Plasticizer & Super Plasticizer.
Experiment 8	**Non-destructive Testing**–Rebound Hammer test, Ultrasonic Pulse Velocity test, Cover meter.

List of Submission

Total number of Experiments

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2	1	1	2	2	1		3	2	2	1	3	3	3
CO 2	2	1	1	2	2	1		3	2	2	1	3	3	3
CO3	2	1	1	2	2	1		3	2	2	1	3	3	3
CO4	2	2	3	3	3	2	3	3	1	3	1	3	3	3

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CA	ESE
Remember	3	3
Understand	6	6
Apply	6	6
Analyse	6	6
Evaluate	4	4
Create	-	
TOTAL	25	25

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE 2409 : Building Planning and Design Lab

Teaching Scheme			Examination Scheme	
Experiments	02 Hrs/week		CA	25
Total Credits	01		ESE	25

Course Outcomes (CO)

Students will be able to

1.	plan and design residential buildings in AutoCAD
2.	read and understand municipal submission drawings and working drawings in AutoCAD
3.	plan various public buildings as per SP-7 and considering byelaws.

	Course Contents	Hours
Experiment 1	Planning and designing of residential building.	**(04)**
Experiment 2	Full set of drawings for the building planned in residential buildings using CAD (a) Municipal Submission drawing. (b)Working drawings 1. Foundation / Centre Line Drawing. 2. Furniture layout plan. 3. Electrification plan 4. Water supply and drainage plan. 5. Vertical and horizontal ventilation.	**(24)**
Experiment 3	Drawing line plans of public buildings (select one building from each of the following types)(7 line plans) using CAD Types of public buildings 1) Educational buildings: younger age range, middle age range 2) Building for health - health centres, hospitals 3) Assembly buildings- recreational halls, cinema theatres, restaurants, hotels, clubs 4) Business and mercantile buildings- shops, banks, markets and malls 5) Industrial buildings- factories, workshops, cold storages 6) Office buildings- administrative buildings, corporate office 7) Buildings for transportation- Bus stations, railway / metro stations	**(12)**

Tutorials

Text Books

1.	Building Design by Shah, Kale, Patki. Tata Mc-Graw Hill Publications. (Edition 2015)
2.	Building Design by Bindra & Arora–S. Chand.(Edition 2008)
3.	

Reference Books

1.	National Building code SP-7.(Edition 2005)
2.	Times Saver standards of Architectural Design Data by Callender, Tata McGaw Hill.
3.	Development plan and DCP Rules of urban local body, New Delhi, Volume 12.
4.	Building Design and construction by Frederick Merrit, Tata McGraw Hill
5.	Model building bye laws by MoUD, GoI.

Useful Links

1.	http://new.usgbc.org/
2.	http://www.grihaindia.org/

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2	1	3	0	1	1	3	1	0	0	0	0	2	2
CO 2	1	3	3	2	3	2	3	3	0	2	2	1	2	2
CO 3	1	3	3	2	3	2	3	3	0	2	2	1	2	2
CO 4														

Assessment Pattern**(with revised Bloom's Taxonomy)**

Knowledge Level	CT 1	CT 2	TA	ESE
Remember			5	5
Understand			5	5
Apply			5	5
Analyse			5	5
Evaluate			5	5
Create				
TOTAL			25	25

Government College of Engineering, Karad

Second Year (Sem – IV) B. Tech. Civil Engineering

CE2410 : Environmental Science

Teaching Scheme			Examination Scheme	
Lectures	03Hrs/week		CT – 1	15
Tutorials	-		CT – 2	15
Total Credits	0 (Audit)		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO)

1.	Students will explain key concepts from Economic, and Social analysis as they pertain to design and evaluation of environmental policies and institutions.
2.	Student will appreciate concepts and methods from ecological and physical sciences and their applications in environmental problem solving.
3.	Student will appreciate the ethical, cross cultural and historical context of environmental issues and the links between human and natural systems.
4.	Student will reflect critically about their roles and identities as citizens, consumers, environmental actors in a complex and interconnected world.

	Course Contents	Hours
Unit 1	**Natural Resources and Associated Problems:** Nature of Environmental Studies: Definition, scope and importance. Multidisciplinary nature of environmental studies Need for public awareness. a) Environment resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using mineral resources. d) Food resources: World food problem, changes caused by agriculture effect of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewable and non-renewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.	**(8)**
Unit 2	**Ecosystems:** Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics features,structure and function of the following ecosystem :- a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem, d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).	**(6)**
Unit 3	**Biodiversity and its conservation:** Introduction- Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation. Western Ghat as a biodiversity region. Hot spot of biodiversity. Threats to biodiversity habitat loss, poaching of wildlife, man- wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	**(6)**
Unit 4	**Environmental Pollution:** Definition: Causes, effects and control measures of: Air pollution, Water pollution, soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of a individual in prevention of pollution.	**(6)**
Unit 5	**Social Issue and Environment:** Disaster management: floods, earthquake, cyclone, tsunami and landslides. Urban problems related to energy Water conservation, rainwater harvesting, watershed management Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, Social Environment, sustainability nuclear accidents and holocaust. Wasteland exclamation. Consumerism and waste products.	**(8)**
Unit 6	**Environmental Protection:**	**(8)**

	From Unsustainable to Sustainable development. Environmental Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Population Growth and Human Health, Human Rights, Environment Impact Assessment, Green Tribunals.	

Field Work	
1.	Visit to a local area to document environmental assets like river/Forest/Grassland/Hill/Mountain. OR Visit to a local polluted site - Urban / Rural / Industrial /Agricultural. OR Study of common plants, insects, birds. OR Study of simple ecosystems - ponds, river, hill slopes, etc
Text Books	
1.	Text Book of Environmental Studies by Dr. P.D. Raut from Shivaji University. (Edition 2013)
2.	Concise Environmental Studies by Dr.MadhukarBachulkar, B.V. Kulkarni, Sharvil A. Shah. R.K. Publications. (Edition 2014)
3.	Miller T.G. Jr., Environmental Science. Wadsworth Publications Co. (Edition 2007)
4.	Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science. (Edition 2012)
5.	Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno- Science Publications. (Edition 2010)
Reference Books	
1.	Agarwal, K.C.2001, Environmental Biology, Nidi Pub. Ltd., Bikaner. (Edition 2011)
2.	BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (Edition 2008)
3.	Cunningham, W.P. Cooper, T.H.Gorhani, E. & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Pub. Mumbai, 1196p (Edition 2010)
4.	De A.K., Environmental Chemistry, Wiley Wastern Ltd. (Edition 2014)
5.	Down to Earth , Centre for Science and Environment , New Delhi. (Edition 2011))
6.	Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, vol. I and II, Environmental Media. (Edition 2014
7.	The Water (Prevention and Control of Pollution) Act, 1974
8.	The Air (Prevention and Control of Pollution) Act, 1981
9.	The Environment (Protection) Act, 1986
10.	Hazardous Wastes (Management and Handling) Rules, 1989
11.	The Forest (Conservation) Act, 1980
12.	The Wildlife Protection Act, 1972
13.	The National Environment Tribunal Act, 1995
14.	The Noise Pollution Act, 1974
Useful Links	
1.	https://nptel.ac.in/courses/120/108/120108004/
2.	https://nptel.ac.in/courses/120/108/120108002/
3.	https://www.youtube.com/watch?v=ZngDF4jfRdw&list=PLyqSpQzTE6M_vO7rLpxKZWqai4uJP2bDa

Government College of Engineering, Karad

Second Year B. Tech. in Civil Engineering

(HSMC) CE 2411: Management in Civil Engineering

Teaching Scheme			Examination Scheme	
Lectures	01 Hrs/week		CT – 1	15
Tutorials	-		CT – 2	15
Total Credits	01		TA	10
			ESE	60
			Duration of ESE	02 Hrs 30 Min

Course Outcomes (CO) : At the end of course students will -

1.	Identify different aspects of site organizational structures, services required on site, personnel management, safety in construction and work study.
2.	Determine EOQ, perform ABC analysis, understand SQC charts and compute standard time.
3.	Understand procurement procedure, Quality circles, ISO 9000 and Performance appraisal.
4.	Appreciate different aspects of material storage, management of accidents, safety in construction and role of computers in construction field.

	Course Contents	Hours
Unit 1	**Management :** Definition, History, Functions Of Management, Principles Of Management,	**(04)**
Unit 2	**Managerial Economics:** Forms of organizations. Types of Costs, Budgets, Break even Analysis, Capital Budgeting,	**(04)**
Unit 3	**Site Layout**: Factor Affecting, Typical Layout of few Major Construction Projects.	**(04)**
Unit 4	**Material Management :** Functions, Inventory control, Simple EOQ model, ABC analysis,	**(04)**
Unit 5	**Labour Laws** : Workmen's Compensation Act, Child Labour Act, Minimum Wages Act	**(04)**
Unit 6	**Personnel Management :** Functions, Recruitment, Placement, Training and induction, Performance appraisal,	**(04)**

Text Books

1.	Principles of Management, KOONTZ AND O DONNEL.
2.	Personal Management and Industries Relations, DALE
3.	Critical Path Methods in Construction ANTILL and WOODHEADS

Reference Books

1.	Accounting for management, S. K. BHATTARCHARYA
2.	Principles of Management and Personal Management, A. S. DESHPANDE

Useful Links

1.	https://swayam.gov.in/
2.	https://nptel.ac.in/
3.	https://www.youtube.com/user/nptelhrd
4.	https://online.stanford.edu/
5.	https://www.mooc-list.com/tags/civil-engineering
6.	https://www.courses.com/civil-engineering
7.	www.khanacademy.org