Government College of Engineering, Karad				
First Year B. Tech Civil Engineering				
CE3101: Applied Physics				

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/Week		**MSE**	20
Tutorials	00 Hrs/Week		**ISE**	20
Total Credits	03		**ESE**	60
			Duration of ESE	02:30 Hrs

Course Outcomes :

After completion of course the Students will be able to-

CO1.	Explain concepts of Crystal Structure, Quantum Physics, light for Engineering.
CO2.	Understand physical significance and fundamental properties of crystal, light, sound, acoustics and NDT
CO3.	Demonstrate applications of different physical phenomena in engineering and technology.
CO4.	Compute required physical quantity from given data.

	Course Contents	CO	Hrs
Unit 1	***The structure of Crystalline Solids / Solid State Physics:*** Introduction (Lattice point, Space lattice, Basis, Crystalline solid), Unit cell- Primitive and non- primitive, Lattice parameters, Bravais Lattice (Seven crystal systems), Miller indices, Characteristics and examples, inter planer distance and their examples, relation between density and lattice constant, with examples, Bragg's law and spectrometer, Determination of crystal structures with X-ray diffraction spectrometer and examples.	CO1, CO2 CO3	(06)
Unit 2	***Wave optics*** Interference of light, Newton's rings, Examples, Farunhofer's diffraction from a single slit, Rayleigh criterion; Diffraction gratings and its theory, Wavelength of spectral lines, resolving power, Examples, Double Refraction, Positive and Negative crystal, Optical activity, Specific Rotation, Half Shade Polarimeter and their Examples.	CO1, CO2 CO3	(07)
Unit 3	***LASER*** Introduction, Characteristics of LASER beam, Absorption, Spontaneous Emission, Stimulated Emission, Population Inversion, Types of pumping agent, Components of LASER, Lasing action, Solid-state lasers (ruby), Diode Laser, Applications of LASER in science and engineering, Holography Techniques.	CO2, CO3, CO4	(07)
Unit 4	**Acoustics and Ultrasonic** **Acoustics**: Architectural Acoustics, Reverberation Time, Absorption, Sabine's formula, Conditions and Remedies for good acoustics, Method of design for good Acoustics problems. **Ultrasonic waves:** Ultrasonic waves, Characteristics of Ultrasonic waves, Magnetostriction oscillator and Piezoelectric Oscillator, Applications. Problems	CO2, CO3, CO4	(06)
Unit 5	**Quantum Physics:** Introduction to Quantum mechanics, Wave Particles Duality, De-Broglie waves, Properties of Matter wave, Physical significance of wave function, Heisenberg Uncertainty principle for position and momentum of particle, Compton Effect and Photoelectric Effect and their examples.	CO1, CO2	(06)
Unit 6	**Non-destructive testing:** Types of defect, Method of NDT, Visual Inspection, Liquid/Dye penetrant Testing, Magnetic particle testing, Eddy current testing, Ultrasonic inspection testing, x-ray radiography, Advantages.	CO2, CO3, CO4	(08)

Text Books

1.	Avadhanulu and Kshirsagar- Engineering Physics ,S Chand publishing
2.	V. Rajendran -Engineering Physics,Tata McGraw-Hill Publishing Company limited

	Reference Books
1.	S. O. Pillai, Solid State Physics: Structure & Electron Related Properties, Eastern Ltd,, New Age International Ltd.
2.	Charles Kittle, Introduction to Solid State Physics - Wiley India Pvt. Ltd.(8th Edition).
3.	Alan Giambattista and others- Fundamentals of physics, Tata Mc. Graw Hills
4.	B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi.
5.	R. K. Gaur & Gupta S. L, Engineering Physics -Dhanapat Rai Publication.
6.	Arthur Beiser -Modern Physics - Tata Mc. Graw Hills
7.	K. Thyagarajan, A. K. Ghatak- LASERS Theory and Applications ; Macmillan India Limited.
8.	L. J. Schiff- Quantum Mechanics ; Mc-Graw Hill International Edition.
9.	N. Subramanyam & Brijlal- Text Book of Optics ; (Vikas Publishing House Pvt.Ltd)
	Useful Links
1.	en.wikipedia.org/wiki/ Fundamentals of_Physics
2.	www.hyperphysics.com, www.google.com
3.	physics.info/magnetism, www.youtube.com, Nptl video

Mapping of COs and POs

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	1	-	-	1	1	-	-	-	-	1	-	-
CO 2	3	2	1	-	-	1	1	-	-	-	-	1	-	-
CO 3	3	2	1	-	-	1	1	-	-	-	-	1	-	-
CO 4	3	2	1	-	-	1	1	-	-	-	-	1	-	-

Assessment Pattern: (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	4	20
Understand	5	4	-
Apply	5	4	10
Analyse	-	4	20
Evaluate	5	4	10
Create	-	-	-
Total	20	20	60

Government College of Engineering, Karad					
First Year B. Tech Civil Engineering					
CE3102- Applied Mathematics-I					
Teaching Scheme			**Examination Scheme**		
Lectures	03 Hrs/week		MSE	20	
Tutorials	01 Hrs/week		ISE	20	
Total Credits	04		ESE	60	
			Duration of ESE	02 Hrs 30 Min	

Course Outcomes: After completion of the course the student will be able to

CO1	Utilize concept of linear algebra for implementing Engineering domain problems.
CO2	Separate real and imaginary parts of Hyperbolic functions and logarithms of complex number.
CO3	Deal with functions of several variables, Jacobians and their applications.
CO4	Apply vector calculus for Engineering applications.

	Course Contents	**CO**	**Hours**
Unit 1	**Solution of System of simultaneous linear equations:** Rank of a matrix, Rank using normal & Echelon form, System of linear equations; consistency of homogeneous & nonhomogeneous systems, Linear dependence and independence of vectors.	CO1	**(7)**
Unit 2	**Eigen Values and Eigen Vectors:** Eigen values and Eigen vectors and their properties, Cayley-Hamilton Theorem (without proof), powers of matrix, diagonalization of matrices.	CO1	**(7)**
Unit 3	**Complex Numbers:** Demoivre's theorem, Circular functions, Hyperbolic and Inverse Hyperbolic functions, Logarithms of complex number, separation into real and imaginary parts of a complex number.	CO2	**(7)**
Unit 4	**Partial Differentiation:** Partial derivatives, Homogeneous functions and Euler's theorem, Composite function, total derivative, Applications to partial differentiation-Errors and Approximations	CO3	**(7)**
Unit 5	**Jacobian:** Properties, Jacobian of implicit function, partial derivatives of implicit function using Jacobian.	CO3	**(7)**
Unit 6	**Vector Calculus:** Velocity and acceleration: Tangential and normal components of acceleration, Scalar and vector point functions, Gradient of scalar point function, Directional Derivatives, Curl and Divergence of vector point functions. Solenoidal and irrotational force fields.	CO4	**(7)**
Tutorials: Following is tentative list of tutorials to be conducted in the tutorial class based on- 1. Rank, consistency of system of equations. 2. Linear dependence and independence of vectors. 3. Eigen values and Eigen vectors. 4. Powers of matrix and diagonalization of matrices. 5. Separation into real and imaginary part of hyperbolic and logarithmic function. 6. Direct differentiation and Euler's theorem. 7. Composite function and total derivative. 8. Errors and approximations. 9. Jacobian of implicit function. 10. Directional Derivatives, Curl and Divergence of vector point function.			**(10)**

Text Books

1.	H.K.Das, S. Chand -Advanced Engineering Mathematics by and sons,22nd edition, 2018.
2.	Debashis Datta- Textbook of Engineering Mathematics New Age International Publication,6th edition 2006.
3.	Ravish R..Singh, Mukul Bhatt-.Engineering Mathematics A Tutorial Approach, Tata, McGraw Hill 2010.

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, 11th Reprint, 2010.
5.	D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005

6.	B. S. Grewal.,Higher Engineering Mathematics, , 43th edition, Khanna publication, New Delhi 2013.
7.	N P Bali and Dr.Manish Goyal, Textbook of Engineering Mathematics Laxmi publication 12th edition 2020.

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	PSO 3
CO 1	2	2	1	2	-	-	-	-	-	-	-	-	-	-	-
CO 2	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO 3	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO 4	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	4	10
Understand	-	4	10
Apply	5	4	15
Analyse	5	4	10
Evaluate	5	4	15
Create	-	-	-
TOTAL	20	20	60

PLEASE NOTE: *Maximum 3-4 course outcomes are recommended to include in the curriculum. Use Bloom's taxonomy to define course outcomes. Refer AICTE new model curriculum for the same, if required.*

Government College of Engineering, Karad				
First Year (Sem – I) B. Tech. Civil Engineering				
CE3103 Basics of Civil Engineering				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/Week		**MSE**	20
Tutorials			**ISE**	20
Total Credits	03		**ESE**	60

Course Outcomes (CO):

Students will be able to

CO1	Understand role of Civil Engineer & applications of various branches of Civil Engineering
CO2	Know various building components, their functions and essential materials for construction
CO3	Identify surveying & levelling instruments and understand their applicability
CO4	Understand types of infrastructure and basics of transport systems

	Course Contents	CO	Hrs
Unit 1	**Introduction to Civil Engineering :** Role of Civil Engineer in various construction activities, Branches of Civil Engineering, Principles of planning, Selection of site for residential building, Important building bye-Laws, Basic units & its conversions, Typical plan of residential building with introduction to line plan, elevation & section	CO1	(07)
Unit 2	**Building Components :** Sub-structure: Types of soil and rocks as foundation strata, Concept of bearing capacity, Types of foundations i.e. shallow & deep foundations with their suitability, Plinth, Super-structure: Elements of super-structures and their functions : walls, floor, roof, doors & windows, lintel, staircase, etc.	CO2	(06)
Unit 3	**Building Materials:** Use and properties of the following materials: Concrete (Ingredients, grades & types of concrete), Mortar, bricks, stone, aggregate, sand, steel, cement, etc., Important field tests on cement, brick, sand, etc. **Types of structures:** Introduction to types of loads, Difference between load bearing and framed structures.	CO2	(07)
Unit 4	**Surveying**: Principles of surveying, Classification of surveys, Chain Surveying, Introduction to metric chain and tapes, Nominal scale and representative fraction., ranging, offset, cross staff survey, meridian, bearing and its types, compass survey & its types	CO3	(06)
Unit 5	**Levelling:** Introduction, Basic terminology, Types of Level, Levelling Staff, Temporary adjustments of level, Methods of calculating R. L., **Contour:** Uses and characteristics of contours, Introduction to Remote sensing, Geographical Information System (GIS), Global Positioning System (GPS) and and its applications in Civil Engineering	CO3	(07)
Unit 6	**Introduction to Infrastructure:** Role of Infrastructure in Economic development, Types of Infrastructure, **Important Transportation systems- Roads:** Classification of roads, General cross section & elements of road structure, rigid and flexible pavement, **Railways:** Important technical terms, components of railway track, **Bridges:** Types, Components, Maintenance.	CO4	(07)

Text Books

1.	Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications.
2.	Basic Civil Engineering by Dr. B. C. Punmia, Ashok K. Jain, Arun K. Jain, ISBN-13: 978-8170084037
3.	A Text-Book of Building Construction by by S. P Arora, S. P Bindra. Dhanpat Rai Publication. ISBN 978-8189928803
4.	Surveying I, Punmia B. C., Ashok Kumar Jain, Arun Kumar Jain, Laxmi publications, New Delhi
5.	Surveying and Levelling, Basak N. N., McGraw Hill Publication, New Delhi

Reference Books

1.	Basic Civil Engineering by G. K. Hiraskar, DhanpatRai Publication
2.	Building Materials by S.K.Duggal New Age Publishers. ISBN:- 978-9387788398
3.	K.R. Arora, "Surveying Vol. 1" Standard Book House, New Delhi. –2010
4.	R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, NewDelhi
5.	Justo C. E. G., Khanna S. K., Veeraragavan A., "Highway Engineering" , Nemchand & Bros (10th Edition). 2015.

Useful Links	
1.	http://www.nptel.iitk.ac.in/BharatLohani
2.	http://www.nptel.iitr.ac.in/S.K.Ghosh

Mapping of COs and POs

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2	1	-	-	1	-	1	-	-	-	-	-	-	-
CO 2	3	1	-	-	-	-	-	-	-	-	1	-	-	-
CO 3	1	-	2	1	-	2	2	-	-	-	-	1	-	-
CO 4	-	-	2	-	2	1	-	2	1	2	-	-	-	-

Assessment Pattern: (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	4	15
Understand	5	4	15
Apply	5	4	12
Analyse	3	4	9
Evaluate	2	4	9
Create	-	-	-
Total	20	20	60

Government College of Engineering, Karad					
First Year (Sem – II) B. Tech. Civil Engineering					
CE3104: Engineering Graphics					
Teaching Scheme			Examination Scheme		
Lectures	03 Hrs/Week		MSE	20	
Tutorials	00 Hrs/Week		ISE	20	
Total Credits	03		ESE	60	
			Duration of ESE	3 hrs	

Prerequisite: Nil

Course Objectives:

1.	To comprehend and develop skills to use, different types of drawing instruments, pencils, types of lines, symbols & conventions, to read and write the language of Engineering Graphics
2.	Understand elements of Dimensioning and annotate two dimensional engineering drawings. Understand and draw different types of scales and its applications
3.	To comprehend general Projection theory, and apply it to get projections of lines, planes, solids, section of solids, isometric projection, perspective views *etc*, to represent 3D object in 2D or vice versa.
4.	To develop the ability to visualise and communicate 3D shapes in engineering practice.

	Course Contents	CO	Hrs
Unit 1	**Introduction to Engineering Drawing& Engineering Curves:** Principles of Engineering Graphics and its significance, usage of Drawing instruments and accessories, layout of drawing sheets, different types of lines used in drawing practice, lettering, Introduction to SP46: 2003, Dimensioning system as per BIS, Geometric constructions. **Scales:** Representative fraction (RF), units of lengths, Types of scales, Plain scale, diagonal scale, comparative OR corresponding scale, and chord scale.	CO1, CO2	(08)
Unit 2	**Theory of Projections:** Principles & theory of Projections, projection systems, projection methods, First angle & third angle method of projection, relative positions of different view, symbol of first angle and third angle; Auxiliary planes; AIP, AVP, views on auxiliary planes. **Projection of Points & Lines:** Projections of Points situated in any quadrant, notation system. Projection of straight line; parallel, inclined and oblique *w.r.t.* reference planes (RP's). Traces of lines, (Line only first quadrant should be considered). Grade & bearing.	CO1, CO3	(08)
Unit 3	**Projections of Regular Planes:** Types of planes, Projections of planes, positioned - parallel, inclined, and oblique *w.r.t.* HP & VP planes.	CO1, CO3	(06)
Unit 4	**Projections of Regular Solids:** Types of Solids, Projection of simple solids; Prisms, Pyramids, and cylinder, cone inclined to both reference planes.	CO1, CO3, CO4	(06)
Unit 5	**Projections of Regular Sectional Solids:** Sections and Sectional views of right angular Solids; Prism, Cylinder, Pyramid, Cone – Auxiliary Views; finding true shape of a section.	CO1, CO4	(04)
Unit 6	**Isometric Projections:** Principles of Isometric projection – Terminology, Isometric Scale, Isometric Views of standard shapes & standard solids. **Perspective Projection**: Concept, terminology, types: one point perspective, two point perspective considering simple shape objects only	CO4	(08)

In semester Evaluation (ISE) shall be done on punctuality, interactive participation in class, laboratory work done and oral assessment

Course Outcomes (CO):

Students will be able to

1.	Understand theory of projections and apply it for communication shape and size of geometric element using appropriate projection method
2.	Construct different types of scales, and know the application in engineering filed
3.	Analyse visually and draw projection of points, straight lines, planes, solids, section of solids

4.	Appreciate use of Orthographic & isometric drawing, perspective views.			

Text Books

1.	Bhatt N.D., Engineering Drawing: Plane & Solid Geometry, 54th edition, 2023, Charotar Publishing House
2.	Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3.	Basant Agrawal, C M Agrawal, Engineering Graphics, 3rd edition (2019)TMH Publication
4.	Dhananjay A Jolhe, Engineering Drawing with an introduction to AutoCAD, TMH Publication, (2010)

Reference Books

1.	Cencil Jenson, Jay D. Helsel, D. R. Short, Engineering Drawing & Design, 7th ed, 2015 TMH Pub
2.	M. L. Dabhade, Engineering Graphics, Vision Publication
3.	Kristie Plantenberg, Engineering Graphics Essentials, 5th ed, 2015 University of Detroit Mercy, SDC Publication

Useful Links

1.	https://nptel.ac.in/courses/112103019/
2.	https://archive.nptel.ac.in/courses/112/102/112102304/
3.	https://archive.nptel.ac.in/courses/112/105/112105294/

Mapping of COs and POs

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2			2			3	2	2		2	1	1
CO 2	2	1			2			2	2	3		1	1	1
CO 3	3	3			3			2	2	3		2	1	1
CO 4	2	2			3			2	2	3		3	1	1

Assessment Pattern: (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	4	4	12
Apply	4	4	12
Analyse	4	4	12
Evaluate	4	4	12
Create	-	-	-
Total	20	20	60

Government College of Engineering, Karad				
First Year (Sem – I) B. Tech. Civil				
CE 3105: Design Thinking				
Teaching Scheme			**Examination Scheme**	
Lectures	01 Hrs/week		MSE	--
Practical	02 Hrs/week		ISE	50
Total Credits	02		ESE	--
Prerequisite : Professional Skills				
Course Outcomes (CO): Students will be able to				
CO1	Compare and classify the various learning styles and apply them in their engineering education.			
CO2	Develop new ways of creative thinking and learn the innovation cycle of Design Thinking process for developing innovative products.			
CO3	Prepare empathy map and journey map for problem.			
CO4	Possess skills necessary to communicate design engineering ideas and design and apply innovative ideas using prototypes.			

Course Contents		CO	Hours
Unit 1	**Overview of Design Thinking Process:** Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting, Design Thinking Process: Business context of innovation for applying design thinking, two models of design thinking, phases of design thinking.	CO1, CO2	(04)
Unit 2	**Introduction to design thinking and its approaches:** Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Origin of design thinking, understanding design thinking and its process model, Human-Centered Design (HCD) process - Empathize, Define, Ideate, Prototype and Test and Iterate or Empathize, Analyze, Solve and Test.	CO1	(05)
Unit 3	**Empathize** How to emphasize, Role of empathy in design thinking, purpose of empathy maps, Things to be done prior to empathy mapping, creation of user personas, customer journey mapping.	CO2, CO3	(04)
Unit 4	**Analyze or Define** Root cause analysis, conflict of interest, perspective analysis, big picture thinking through system operator, big picture thinking through function modelling Silent brainstorming, metaphors for ideation, CREATE and What-If tool for ideation, introduction to TRIZ, Inventive principles and their applications	CO1, CO2	(05)
Unit 5	**Test (Prototyping and Validation)** What is Prototype? Why Prototype? Rapid Prototype Development process, Testing, Sample Example, Test Group Marketing Prototyping, Assumptions during the design thinking process, Validation in the market, best practices of presentation.	CO2, CO4	(05)
Unit 6	**Design Innovation** Benefits of iteration in the design thinking process, taking the idea to the market, introduction to innovation management in a company.	CO4	(05)
Laboratory Content			
Experiment 1	Understanding of Design Thinking and its process model, Principles, and tools. (Activity: Design a mind map for processes of design thinking).	CO1, CO2	
Experiment 2	How to Empathize, Role of Empathy in design thinking, Empathy Maps Design. (Activity: Construct empathy maps to provide right solution to any challenges through interviews, GD, observations, and other sources).	CO3	
Experiment 3	Methods for Empathetic Design, Creation of User Personas. (Activity: Construct Persona profile which includes user information).	CO2, CO3	

Experiment 4	Customer Journey Mapping (Activity**:** Develop customer journey map to provide a roadmap visual of customers experience).	**CO3**
Experiment 5	Problem clarification, Understanding of the problem. (Activity: Construct worksheet for customer journey map to select best route).	**CO1**
Experiment 6	Problem analysis and Reformulation of the problem. (Activity: Generate summarised report for customer journey map).	**CO2**
Experiment 7	Case Study - students can pick one idea from their brainstorm list and use the "Sketch Prototype Worksheet" to sketch out their solution for their classmate.	**CO2**
Experiment 8	Root Causes Analysis, Conflict of Interest, Description of customer need.	**CO4**
Experiment 9	Design Cash Flow Diagram and Value Chain Analysis Diagram for weekly expenditure of person.	**CO2**
Experiment 10	Study the iterations in design thinking process.	**CO2, CO4**

Textbooks	
1.	Bala Ramadurai, "Karmic Design Thinking", First Edition, 2020. (Unit:1,2,3,4,5,6)
2.	E. Balaguruswamy, "Developing Thinking Skills (The way to Success)", Khanna Book Publishing Company, 2022. (Unit:1,2,3,4,5,6)

Reference Books	
1.	Vijay Kumar,"101 "Design Methods: A Structured Approach for Driving Innovation in Your Organization".
2.	IDEO ,"Human-Centered Design Toolkit: An Open-Source Toolkit to Inspire New Solutions in the Developing World", IDEO 2011.
3.	Marc Stickdorn and Jakob Schneider," This is Service Design Thinking: Basics, Tools, Cases", BIS Publishers,2014.
4.	Ulrich, Karl T. Design: Creation of artifacts in society, 2011.
5.	Tim Brown "Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation", Harper Collins, 2009.

Useful Links	
1.	https://onlinecourses.nptel.ac.in/noc22_mg32/preview By Prof. Bala Ramadurai/ IIT Madras
2.	https://youtu.be/4nTh3AP6knM by Simplilearn
3.	https://www.tutorialspoint.com/design_thinking/design_thinking_introduction.htm

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	1	2	1	1	-	1	-	-	-	-	-	-	1	1
CO 2	1	1	2	2	-	-	-	1	-	-	-	-	2	1
CO 3	1	1	3	2	2	-	-	-	2	2	-	-	1	1
CO 4	1	2	2	1	1	1	-	-	-	-	-	-	2	1

Government College of Engineering, Karad				
First Year B. Tech. Civil Engineering				
CE3106-Engineering Physics Lab				
Laboratory Scheme:			**Examination Scheme:**	
Practical	2 Hrs/Week		ISE	25
Total Credits	1		ESE	25

Course Outcomes :

After the completion of the course, the student will be able to:

CO1	Demonstrate structure of Material.
CO2	Demonstrate a behavior of light by LASER, Ultrasonic waves and monochromatic light.
CO3	Compute required physical quantity from given data.
CO4	Demonstrate recent synthesis methods for engineering and technology.

Course Contents		CO
Experiment 1	To identify symmetric elements of Cubic crystal.	**CO1, CO3**
Experiment 2	To identify crystal structure from X-Ray diffraction pattern.	**CO1, CO3**
Experiment 3	To determine the velocity of ultrasonic waves in liquid medium by interferometer.	**CO2, CO4**
Experiment 4	Find an object by Ultrasonic waves	**CO2, CO4**
Experiment 5	To calculate the divergence of LASER beam.	**CO2, CO4**
Experiment 6	Determination of wavelength of LASER using diffraction grating.	**CO2, CO4**
Experiment 7	To study interference pattern by Newton's ring Experiment.	**CO2, CO4**
Experiment 8	To determine the specific rotation of the given sugar solution with Polarimeter.	**CO2, CO3,CO4**
Experiment 9	To calculate Resolving power of Telescope	**CO2, CO3**
Experiment 10	To understand the quantization of energy by Frank Hertz Experiment	**CO2, CO3**
Experiment 11	To study Inverse Square Law.	**CO2, CO3**
Experiment 12	To study fundamentals of fiber optics using fiber optics trainer	**CO2, CO3**
Experiment 13	To understand the reconstruction of hologram by Holography	**CO2, CO3**
Experiment 14	To calculate the reverberation time of specific hall.	**CO2, CO4**
	Demonstration Experiment	
Experiment 15	To synthesize Nano particles by spray Pyrolysis/CVD method	**CO4**
Experiment 16	To study behavior of material with temperature by TGA/DTA.	**CO4**

List of Submission:

1.	Minimum number of Experiments: 10

Mapping of COs and Pos:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	3	1	-		1	1	-	1	-	2	2	-	-
CO 2	3	3	1	-	-	1	1	-	1	-	2	2	-	-
CO 3	3	3	1	-	-	1	1	-	1	-	2	2	-	-
CO 4	3	3	1	-	-	1	1	-	1	-	2	2	-	-

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
ISE											25

Government College of Engineering, Karad				
First Year (Sem – II) B. Tech. Civil Engineering				
CE3107: Engineering Graphics Lab				
Laboratory Scheme:			**Examination Scheme:**	
Practical	2 Hrs/Week		ISE	50
Total Credits	1		ESE (pr)	

Prerequisite : Nil

Course Objectives :

1.	Acquire skills sets to use engineering drawing instruments, symbols, conventions, title block in engineering drawing, to communicate his ideas, information and instructions.
2.	Dimension and annotate two-dimension & three dimensional engineering drawings
3.	Plan and prepare neat engineering drawing of various scales, orthographic drawings of points, straight lines, planes, solids, and section of solids, isometric views, perspective views
4.	To enable students to acquire requisite knowledge, techniques and attitude required for advanced study of engineering drawing

Course Contents		CO
Dwg Sheet no. 1	Scales	CO1, CO2, CO3
Dwg Sheet no. 2	Projections of Points & Lines	CO1, CO2, CO3, CO4
Dwg Sheet no. 3	Projections of Planes	CO1, CO2, CO3, CO4
Dwg Sheet no. 4	Projections of Solids	CO1, CO2, CO3, CO4
Dwg Sheet no. 5	Projections of Section of Solids	CO1, CO2, CO3, CO4
Dwg Sheet no. 6	Isometric Projections of Simple solids	CO1, CO2, CO3, CO4
Dwg Sheet no. 7	Perspective views	CO1, CO2, CO3, CO4
Dwg Sheet no. 8	Orthographic Projection of Simple components (optional)	CO1, CO2, CO3, CO4

ESE will be based on Oral examination on submission work of Drawing sheets, Quiz etc

Course Outcomes (CO):

Students will be able to

1.	Acquire skills sets to use engineering drawing instruments, symbols, conventions, title block in engineering drawing, to communicate his ideas, information and instructions.
2.	Dimension and annotate two-dimension & three dimensional engineering drawings
3.	Plan and prepare neat engineering drawing of various engineering curves, orthographic drawings of points, straight lines, planes, solids, and section of solids, isometric views, perspective views
4.	Develop a skill of visualization to understand and read the engineering drawing

List of Submission:

1.	Minimum number of Experiments: 6

Mapping of COs and Pos:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2			3			1		2		1	1	1
CO2	2	2			2			2		3		2	1	1
CO3	3	3			3			2		3		2	1	1
CO4	2	2			2			2		3		2	1	1

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7				Avg
Task I	15	15	15	15	15	15	15				
Task II	05	05	05	05	05	05	05				
Task III	05	05	05	05	05	05	05				
ISE											

Government College of Engineering, Karad			
First Year B. Tech. Civil Engineering			
CE3108: Professional Communication Skills			

Laboratory Scheme			Examination Scheme	
Lecture	1Hrs/week		CA	50
Practical	2Hrs/week		ESE	25
Total Credits	2			

Course Outcomes (CO): After completion of the course student will be able to

CO1	Provide a learning environment to practice listening, speaking, reading and writing skills.
CO2	Assist the students to carry on the tasks and activities through guided instructions and materials
CO3	Effectively integrate English language learning with employability skills and training.
CO4	Provide hands-on experience through case-studies, mini-projects, group and individual presentations.

List of Experiments		CO
Experiment 1	**Newspaper Reading**, finding difficult English words to enhance the glossary. Write down the summary of News and Present it effectively.	CO1
Experiment 2	**Reading Skills**- Reading Book (Any book) finding difficult English words to enhance the glossary. Write down the summary of book/any Topic and Present it effectively. Self-Introduction Activity	CO1
Experiment 3	**Reading Sills**- Watching English Movies Write down the same to Summaries. Strategies for Creating & Editing Effective Writing -Email Writing Activity	CO2
Experiment 4	**Reading Skills**- Listening English podcast, (seen and the unseen) Write down the same to Summaries. Extempore Activity	CO3
Experiment 5	**Reading Skills**- Reading Readers Digest/India Today/Autocar/EFY. Write down the same to Summaries. Strategies for Creating & Editing Effective Writing=Blog Writing (specific/suggest topics/give topics)	CO1
Experiment 6	**Watching Ted Talk and summarize it.** Strategies for Creating & Editing Effective Writing -Story writing and Narration	CO3
Experiment 7	**Develop a Welcome speech** on the given Theme/situation /Formulate a speech for introducing a guest in the given situation. **Group Discussion**- Group Discussion Rules	CO3
Experiment 8	**Just a Minute (JAM) -**Prepare for 1 min on spontaneous topic and deliver public talk on same.Solving MNC (Company 1) Verbal Ability questions	CO4
Experiment 9	**Debate:** International Topic and summarize the opinion as a Country. Strategies for Creating & Editing Effective Writing -Email Writing Activity2	CO4
Experiment 10	**Writing effective resumes and Cover Letters** Mock Interviews (Personal HR)	CO3

Text Books

1.	AICTE's Prescribed Textbook: English (with Lab Manual), Khanna Book Publishing Co.
2.	Kul Bhushan Kumar, Effective Communication Skills. Khanna Book Publishing, 2022.
3.	Practical English Usage. Michael Swan. OUP. 1995. 4. Remedial English Grammar. F.T. Wood. Macmillan.2007 5. On Writing Well. William Zinsser. Harper Resource Book. 2001 6. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006. https://www.coursera.org/specializations/improve-english

List of Submission			
	1	Total number of Experiments: Minimum 10	
	2	Total number of sheets: NA	
	3	Project/Dissertation Report: NA	
	4	Seminar report: NA	
	5	Field Visit Report: NA	

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	2	-	-	-	-	-	-	-	-	-	-
CO 2	2	2	1	1	-	-	-	-	-	-	-	-	-	-
CO 3	2	2	1	1	-	-	-	-	-	-	-	-	-	-
CO 4	2	2	1	1	-	-	-	-	-	-	-	-	-	-

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CA	ESE
Remember	10	05
Understand	15	05
Apply	15	10
Analyse	10	05
Evaluate	-	-
Create	-	-
TOTAL	50	25

Government College of Engineering, Karad		
First Year (Sem – I) B. Tech. Civil Engineering		
CE3109 Civil Workshop		

Laboratory Scheme:			Examination Scheme:	
Practical	4 Hrs/Week		ISE	100
Total Credits	2		ESE	25

Course Outcomes (CO):

Students will be able to

CO1	Understand various construction processes, building components, building materials and principles of planning
CO2	Compute linear & angular measurements using chain, tapes, cross staff & compass
CO3	Use levelling instruments to determine reduced levels of ground points
CO4	Use digital planimeter to calculate the areas

Course Contents		CO
Experiment 1	To measure distance between two survey stations using tape, chain and ranging rods when two stations are intervisible	CO2
Experiment 2	Plotting the outlines of building by chaining, ranging and offsetting	CO2
Experiment 3	To measure fore bearing and back bearing of survey lines of open traverse using prismatic compass	CO2
Experiment 4	Plotting of closed traverse by surveyor's compass	CO2
Experiment 5	Drawing sheet showing 1. various sign conventions 2. various building elements	CO1
Experiment 6	Finding out gradient of line by collimation plane method and rise and fall method	CO3
Experiment 7	Site visit to study various construction processes, building components, building materials and principles of planning	CO1
Experiment 8	To measure area of irregular figure using digital planimeter	CO4
Project 1	Project work: Undertake Survey project with chain and compass for closed traverse for minimum 5 sides around a building.	CO2
Project 2	Project work: Undertake Survey project with levelling instrument for a road length of 500m & determine reduced levels.	CO3

List of Submission:

1.	List of experiments given above be carried out and drawing sheets be plotted wherever necessary.
2.	Project Report & site visit report

Mapping of COs and POs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	-	-	1	-	-	-	3	-	-	1	2	1
CO2	2	2	2	1	3	-	-	-	3	1	1	1	1	2
CO3	2	2	2	1	3	-	-	-	3	2	1	-	2	1
CO4	1	1	2	-	-	-	-	-	3	-	-	-	1	2

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Project 1	Project 2	Avg
Task I	40	40	40	40	40	40	40	40	40	40	40
Task II	20	20	20	20	20	20	20	20	20	20	20
Task III	20	20	20	20	20	20	20	20	20	20	20
ISE	100	100	100	100	100	100	100	100	100	100	100

Government College of Engineering, Karad				
First Year B.Tech. Civil Engineering				
CE3110 : Yoga				
Laboratory Scheme:			**Examination Scheme:**	
Practical	2 Hrs/Week		**ISE**	50
Total Credits	1		**ESE**	00

Course Outcomes(CO): After completion of the course students will be able to

CO1	Understand basic skills associated with yoga which builds up physical, mental strength, flexibility, balance and coordination.
CO2	Learn breathing exercises and healthy fitness activities.
CO3	Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
CO4	Develop understanding of psychological problems associated with the age and lifestyle. Also apply injury prevention principles related to yoga.

Course Contents	CO
Following list of topics and practical's is only the guidelines to the instructor: • योगाचा इतिहास: योगसूत्र ग्रंथ, पतंजली मुनी. • अष्टांग योग: १. यम: अहिंसा,सत्य,अस्तेय,ब्रम्हचर्य,अपरिग्रह २. नियम:शौच,संतोष,तपास,स्वाध्याय,ईश्वरप्रणीधान ३. आसन: विविध स्थितीतील आसने ४. प्राणायाम : विविध प्रकार ५. प्रार्थना ६. धारणा: एकाग्र चित्त ७. ध्यान ८. समाधी वरील अष्टांग योगाचे थोडक्यात महत्व • सूर्यनमस्कार: महत्व व फायदे • प्रात्यक्षिक : प्रार्थना,सूर्यनमस्कार,आसने,प्राणायाम व ध्यान याचा सराव	CO1 CO2 CO3 CO4

Reference Books:

1.	Nagendra, H. R. & Nagarathna, R. (2002). Samagra Yoga Chikitse.Bengaluru: Swami Vivekananda Yoga Prakasana.
2.	Kumar, Ajith. (1984) Yoga Pravesha. Bengaluru: Rashtrothanna Prakashana.
3.	D.M Jyoti, Yoga and Physical Activities (2015) lulu.com3101, Hillsborough, NC27609, United States.
4.	Uppal, A.K. (1992). Physical Fitness. New Delhi : Friends Publication.

Mapping of COs and Pos:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	2	2	2	3	2	-	-	-	-
CO2	-	-	-	-	-	2	2	2	3	2	-	-	-	-
CO3	-	-	-	-	-	2	2	2	3	2	-	-	-	-
CO4	-	-	-	-	-	2	1	2	1	1	-	-	-	-

Assessment Pattern:

The evaluation will be done on the basis of participation and performance of students in practical hours. The consistency and accuracy in yoga, intrinsic goodness, right attitude, happiness and joyous way of doing things will be observed by yoga teacher.

Government College of Engineering, Karad						
First Year B. Tech Civil Engineering						
CE-3201- Applied Mathematics-II						
Teaching Scheme			Examination Scheme			
Lectures	03 Hrs/week		MSE		20	
Tutorials	01 Hrs/week		ISE		20	
Total Credits	04		ESE		60	
			Duration of ESE		02 Hrs 30 Min	

Course Outcomes: After completion of the course the student will be able to

CO1	Solve ODEs arising in Engineering domain using analytic and numerical approach.
CO2	Apply advance integral functions and technique.
CO3	Express any periodic function in terms of series expansion.
CO4	Calculate area enclosed by simple curves and volume of solid with the knowledge of higher order integrals.

	Course Contents	CO	Hours
Unit 1	**First Order Ordinary Differential Equations:** Exact differential equations, Integrating Factor, Equations reducible to Exact, linear and reducible to linear differential equations, Applications: Rate of decay and growth, Newton's law of cooling, Conduction of heat.	CO1	**(7)**
Unit 2	**Numerical Methods:** Solution of Ordinary differential equations: by Taylor's Series method, Picard's Method. Runge-Kutta fourth order method for solving first order differential equations. Trapezoidal rule and Simpson's $1/3^{rd}$ and $3/8^{th}$ rules	CO1	**(7)**
Unit 3	**Differential and Integral Calculus:** Gamma function, Beta function and its properties, Differentiation under integral sign, Leibnitz rule.	CO2	**(7)**
Unit 4	**Fourier series:** Dirichlet's conditions, Fourier series in the range $(0,2\pi)$ and $(-\pi,\pi)$, Change of interval, Fourier series in the range $(0, 2l)$ and $(-l, l)$ where l is arbitrary, Even and odd function, Half range sine and cosine series in the range $(0, l)$ where l is arbitrary.	CO3	**(7)**
Unit 5	**Surface Integral and its Applications:** Evaluation of double integration in cartesian and polar coordinates, Change of order of integration, change of variable, Area enclosed by plane curves.	CO4	**(7)**
Unit 6	**Volume Integral and its Applications:** Evaluation of Triple integration in Cartesian, Spherical polar and Cylindrical polar coordinates, Volume of solids by triple integral.	CO4	**(7)**
Tutorials: Following is tentative list of tutorials to be conducted in the tutorial class based on - 1. Exact, reducible to exact, linear and reducible to linear differential equations. 2. Applications to differential equations. 3. Solutions of ODE using numerical methods. 4. Numerical integrations. 5. Beta and Gamma function. 6. Differentiation under integral sign. 7. Fourier series. 8. Half range Fourier series. 9. Surface integration and its applications. 10. Volume integration and its applications.			**(10)**

Text Books

1.	H.K.DAS "Advance Engineering Mathematics" S. Chand publications
2.	Debashis Datta "Textbook of Engineering Mathematics'' New Age International Publication.
3.	Ravish R..Singh, Mukul Bhatt "Engineering Mathematics A Tutorial Approach"..Tata, McGraw Hill.

	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.	W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
4.	S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5.	E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
6.	J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGrawHill, 2004.
7.	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
	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	PSO 3
CO 1	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO 2	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO 3	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO 4	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	4	10
Understand	-	4	10
Apply	5	4	15
Analyse	5	4	10
Evaluate	5	4	15
Create	-	-	-
TOTAL	20	20	60

PLEASE NOTE: Maximum 3-4 course outcomes are recommended to include in the curriculum. Use Bloom's taxonomy to define course outcomes. Refer AICTE new model curriculum for the same, if required.

Government College of Engineering, Karad					
First Year B. Tech. Civil Engineering					
CE 3202- Applied Chemistry					
Teaching Scheme			**Examination Scheme**		
Lectures	03 Hrs/Week		**MSE**	20	
Tutorials	00 Hrs/Week		**ISE**	20	
Total Credits	03		**ESE**	60	
			Duration of ESE	02:30 Hrs	

Course Outcomes (CO): After completion of course the Students will be able to

CO1	Understand fundamental of Chemistry relevant to Engineering field.
CO2	Differentiate hard and soft water; solve the related numerical problems on water purification and its significance in industry and daily life.
CO3	Equipped with basic knowledge of polymer reinforced composites, applications of semiconductor conducting polymers in energy harnessing.
CO4	Acquire Basic knowledge of Nanochemistry to appreciate its applications in the field of Medicine, data storage devices and electronics.
CO5	Understand the causes of corrosion, its consequences and methods to minimize corrosion to improve industrial designs.

	Course Contents	CO	Hrs
Unit 1	**Energy Science:** Fuels: Fuel, classification, characteristics of good fuel, comparison between solid, liquid, gaseous fuel. Calorific value, low and high calorific value, units of calorific value, determination of calorific value by Bomb and Boy's calorimeter. **Energy storage Systems:** Battery technology: Introduction, Classification, characteristics, construction, working and applications of Li-ion battery. **Solar Energy:** Introduction, construction, working and applications of photovoltaic cell. **Green fuel:** Hydrogen-oxygen fuel cell. Construction, working and applications	CO1 CO3 CO4	**(07)**
Unit 2	**Corrosion and it's Prevention:** Introduction, Electrochemical theory of corrosion, Types of corrosion - Differential metal and differential aeration – (pitting and water line) caustic embrittlement. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of corrosion product, nature of metals, pH, conductivity and temperature. Corrosion control: Cathodic protection - sacrificial anode and impressed current methods, Metal coatings – Galvanization and tinning, Anodizing – Anodizing of aluminum, Organic coatings: Paint and varnishes. **Metal finishing:** Introduction, Technological importance. Principles of electroplating of chromium. Metal cladding and Metal spraying.	CO1 CO5	(07)
Unit 3	**Engineering Advanced Materials** **Composites:** Introduction, constitution, classification. Types: Particle, fiber, fiber glass, hybrid and reinforced Composites with applications. **Lubricants:** Introduction, Classifications, functions, Properties- Viscosity index, Flash point, and applications of lubricants. **Cement:** Types of cement, constituents, properties of cement. **Polymers:** Introduction, Synthesis and applications of Polyurethane, polycarbonates, araldite (Epoxy resin). **Conducting Polymers:** Synthesis & Mechanism of conduction in polyacetylene. **Biodegradable polymers:** Introduction and their requirements. Synthesis and properties of Poly lactic acid. Applications of biodegradable polymers in medical industry.	CO1 CO3	(07)
Unit 4	**Environmental & Green Chemistry:** Introduction, definition, Major environmental pollutants, Air, water and noise pollution.	CO1 CO2	(07)

	Optimum levels of pollution. Significance and determination of COD and BOD. Solid waste treatment of collection of NKP. Greenhouse effect and global Warming. eWaste. Radioactive pollution. Basic principles of green chemistry. Various green chemical approaches – Microwave synthesis, Bio catalyzed reactions, Phase transfer catalysis.	CO3 CO4		
Unit 5	**Water technology:** Introduction, sources and impurities in water, portable water; meaning and specifications (as per WHO standards), Hardness of water, types, determination of hardness using EDTA titration, softening of hard water by ion- exchange process. Numerical problems on hardness of water. Biological oxygen demand (BOD) and Chemical Oxygen Demand (COD) Determination of COD of industrial waste water. Purification of water for town supply. Instrumental methods of analysis: Introduction, Theory, Instrumentation and applications Flame Photometry.	CO1 CO2	(07)	
Unit 6	**Nanomaterials**: Introduction, Nanomaterials- preparation of CNT by different methods, CNT properties and applications, size dependent properties (Surface area, Electrical, Optical, Catalytic and Thermal properties). Synthesis of nano materials: Top down and bottom up approaches,, Carbon nano tubes and graphenes – properties and applications. Characterization method for Nano materials, SEM (Scanning Electron Microscope), AFM (Atomic Force Microscopy), STM ('Scanning Tunnelling Microscopy)	CO1 CO3 CO4	(07)	

Text Books

1.	F. W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 15th Edition, 2020.
2.	B. K. Sharma- A text book of Industrial Chemistry. 15th Edition, 2020. G.A. Ozin & A.C. Arsenault, "Nanotechnology A Chemical Approach to Nanomaterials". RSC Publishing, 5th Edition, 2020.

Reference Books

1.	Uppal M.M, Jain and Jain. Engineering Chemistry, Khanna Publishers, 45th Edition, 2020.
2.	P.C. Jain and Monica Jain, A test Book of Engineering Chemistry, Dhanpat Rai Publications, New Delhi, 20th Edition, 2020.
3.	S SDara -A Text book of Engineering Chemistry, S Chand & Company Ltd., 15th Edition, 2020.
4.	B. S. Jai Prakash, R. Venugopal, Sivakumaraiah &PushpaIyengar.,- "Chemistry for Engineering Students", Subash Publications, Bangalore. 10th Edition, 2020.

Useful Links

1.	https://www.youtube.com/watch?v=3O6OfCaVadI&list=PLm_MSClsnwm9p_yaZ8zIW1LxkK7_n98gD
2.	https://www.youtube.com/watch?v=kID3n_-kees
3.	https://www.youtube.com/watch?v=EvoN6vmiCfI&list=PLKSeO-scpOo33zdDN0i2uw1Xh3zh_UfGO

Mapping of COs and Pos

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	-	-	-	2	2	-	-	-	-	1	-	-
CO 2	3	2	-	-	-	2	2	-	-	-	-	1	-	-
CO 3	3	2	-	-	-	2	2	-	-	-	-	1	-	-
CO 4	3	2	-	-	-	2	2	-	-	-	-	1	-	-
CO 5	3	2	-	-	-	2	2	-	-	-	-	1	-	-

Assessment Pattern: (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	8	20
Understand	5	4	10
Apply	5	4	10
Analyse	5	4	20
Evaluate	-	-	-
Create	-	-	-

	Total	20	20	60

<table>
<tr><td colspan="4" align="center">Government College of Engineering, Karad</td></tr>
<tr><td colspan="4" align="center">First Year (Sem – I) B. Tech. Civil Engineering</td></tr>
<tr><td colspan="4" align="center">CE 3203: Programming for problem solving</td></tr>
</table>

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Computer Fundamentals

Course Outcomes (CO): Students will be able to

1.	Understand the basics of C programming language, including syntax, data types, and control structures.
2.	Demonstrate the ability to write and execute C programs using integrated development environments (IDEs)
3.	Apply problem-solving techniques using C programming by writing algorithms and translating them into code.
4.	Develop debugging and testing skills to identify and resolve errors in C programs.

		CO	Hours
Unit 1	**Introduction to Programming** Introduction to components of a computer system. Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples	CO1	(05)
Unit 2	**Introduction to C language** Importance of C Language, Structure of C Program, Constants, variables and data types. Operators and expressions, managing input / output operations, Decision making, branching and loop statements, Storage classes, Functions, elements of User defined functions, return values and their types, methods of parameter passing, recursive functions.	CO1, CO2, CO3	(07)
Unit 3	**Arrays and String** Declaration and initialization of arrays, one dimensional and two-dimensional arrays, operations on array, multidimensional arrays, Declaring and initializing string variables, string handling functions, passing array and string to function.	CO3	(07)
Unit 4	**Structure** Defining and declaring structure, accessing structure members, structure initialization, array of structures, nesting of structure structures and functions, union and enumeration.	CO3, CO4	(07)
Unit 5	**Pointer** Defining and declaring pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer as a function argument, pointer expressions, pointers to arrays, strings and structure, Dynamic memory allocation.	CO4	(07)
Unit 6	**File Handling** File Operations, Character I/O, String I/O, Formatted I/O, Block I/O, Random File Operations.	CO4	(07)

Text Books

1.	E. Balguruswami, "Programming in ANSI C", 6th edition– Tata McGraw Hill, 2012. (Unit 1,2,3,4,5,6)
2.	Yashvant Kanetkar , "Let us C", BPB publications, 2004. (Unit 1,2,3,4,5,6)

Reference Books

1.	B.W. Kernigghan and D. M. Ritchie, "The C Programming Language", 2nd Edition By, Pearson Education.
2.	McGraw-Hill Publications, ISRD Group, "Programming And Problem Solving Using C Language", 1st Edition, 2017.
3.	Schaum's, "Outline of Programming with C", Byron Gottfried, McGraw-Hill, 2nd Edition, 1996.

Useful Links

1.	http://cse02-iiith.vlabs.ac.in/
2.	https://www.digimat.in/nptel/courses/video/106105171/L01.html Prof. Anupam Basu,
3.	https://archive.nptel.ac.in/courses/106/104/106104128/ Satyadev Nandkumar

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	1	2	-	1	-	1	1	-	-	-	-	-	1	-
CO 2	-	1	3	2	1	1	-	-	-	-	-	-	2	-
CO 3	-	1	2	3	-	1	1	-	-	-	-	-	2	-
CO 4	2	1	1	2		1	-	-	-	-	-	-	-	-

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	4	20
Understand	5	4	-
Apply	5	4	10
Analyse	-	4	20
Evaluate	5	4	10
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad				
First Year (Sem – II) B. Tech. Civil Engineering				
CE3204: Engineering Mechanics				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		MSE	20
Tutorials	01 Hrs/week		ISE	20
Total Credits	04		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite :

Course Outcomes (CO): Students will be able to

CO1	Understand basic mechanics and study of basic concepts of mechanics with its applications.
CO2	Study statics including equilibrium of rigid bodies, friction, beams with different supports and loading, Analysis of simple truss.
CO3	Study centroid and moment of inertia of plain composite figures.
CO4	Study kinematics of linear motion, Work energy principal, De Alembert's principle, Impulse–moment principle, Collision of elastic bodies.

	Course Contents	CO	Hours
Unit 1	**Effect of Force and Force System:** Basic concepts and fundamental laws, force, system of forces, resolution and composition of force, resultant, Principal of transmissibility of force, Equilibrium of forces, free body diagram, Lami's theorem, equilibrium equations, equilibrant force, Moment and couple, Varignon's theorem and law of moment.	CO1, CO2	(08)
Unit 2	**Beam:** Definition and types of beams, types of loads, types of supports, analysis of simple and compound beam by analytical method and virtual work method for support reactions. **Friction:** Concept of friction, angle of friction, cone of friction, angle of repose, Friction on horizontal plain and on inclined plain.	CO2	(06)
Unit 3	**Analysis of Struss:** Types of trusses, Assumption, Method of Joints, Method of section, Analysis of simple truss with max. 7 members, Introduction to space truss.	CO2	(06)
Unit 4	**Centroid and M.I. of Plain Figures:** Centroid of plane and composite figures, parallel and perpendicular axis theorems, moment of inertia of standard shapes from first principle, moment of inertia of composite figures, radius of gyration, Concept of mass moment of inertia.	CO3	(06)
Unit 5	**Kinematics**: Kinematics of rectilinear motion, motion curves, Newton's motion Law, Introduction to Projectile.	CO4	(04)
Unit 6	**Kinetics:** De Alembert's principle, work-energy principle, Impulse-momentum principle, Collision of elastic bodies; direct central impact, oblique impact, coefficient of restitution, loss of kinetic energy.	CO4	(06)
Tutorials			**12**

Text Books

1.	Engineering Mechanics, S. S. Bhavikatti, New Age International Pvt. Ltd.
2.	Engineering Mechanics, R. K. Bansal and Sanjay Bansal, Jain Bros. Publishers, Delhi
3.	Textbook of Applied Mechanics", Ramamrutham. S, Dhanpat Rai Publications, 19874 Engineering Mechanics (Statics and Dynamics), Palanichamy, M. S., and Nagan, S

Reference Books

1.	Vector Mechanics for Engineers Vol.-I and II, F. P. Beer and E. R. Johnston, Tata Mc- Graw Hill Publication
2.	Engineering Mechanics, Irving H. Shames, Prentice Hall of India, New Delhi
3.	Engineering Mechanics, S. N. Saluja, Satya Prakashan, New Delhi

Useful Links

1.	NPTEL, www.nptel.ac.in
2.	http://www.schandpublishing.com
3.	Study.com/directory/category/Engineering mechanics

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	-	-	-	-	-	1	-	-	-	1	1
CO 2	2	1	2	-	-	-	-	1	2	-	-	-	2	2
CO 3	2	1	2	-	-	-	-	1	2	-	-	-	2	2
CO 4	1	1	2	-	-	-	-	1	2	-	-	-	2	2

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	10
Understand	4	4	10
Apply	4	4	10
Analyse	4	4	20
Evaluate	4	4	10
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad		
First Year (Sem – II) B. Tech. Civil Engineering		
CE 3205: Indian Knowledge Systems		

Teaching Scheme			**Examination Scheme**	
Lectures	-		ISE	-
Tutorials	-		ESE	100
Total Credits	02			

Course Outcomes (CO): Students will be able to

CO1	Understand and appreciate the rich heritage that resides in our traditions
CO2	Inculcate an understanding of the mind/voice dynamic and its function in Indian knowledge systems
CO3	Learn to appreciate the need and importance of Sanskrit in getting to the roots of the philosophical concepts
CO4	Being primed for practices that will prepare one for the inner-journey to discover the Self

Course Contents

Student should complete any one of the MOOC course certification of Indian Knowledge System and submit the copy of certificate to Head of Department prior to ESE.

Guidelines:

- Duration for completion of MOOC course certification is minimum 8 Weeks.
- Platform: NPTEL or Swayam
- Assessment Guideline: - End semester evaluation will be based on the score secured in NPTEL or Swayam certification and Presentation conducted by Panel of Faculty members.
- 60% weightage will be given for score secured in NPTEL or Swayam certification and 40% weightage will be given for presentation.
- If students fail to complete the NPTEL or Swayam certification, student can complete it from other platforms with the prior permission of Head of department.

Government College of Engineering, Karad				
First Year B. Tech. Civil Engineering				
CE3206-Applied Chemistry Lab				
Laboratory Scheme:			**Examination Scheme:**	
Practical	2 Hrs/Week		ISE	25
Total Credits	1		ESE	25

Course Outcomes (CO): After completion of course the Students will be able to

CO1	Analyze & generate experimental skills.
CO2	Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
CO3	Employ the basic techniques used in chemistry laboratory for analyses such as PH Metry, IR spectroscopy, volumetric titrations.
CO4	learn safety rules in the practice of laboratory investigations

Course Contents		CO
Experiment 1	To Determine the total hardness of water.	CO1,CO3,CO4
Experiment 2	To Determine Calorific Value of Coal sample.	CO1,CO3,CO4
Experiment 3	To determine the chloride content from water	CO1,CO3,CO4
Experiment 4	Preparation of urea formaldehyde	CO1,CO2,CO3,CO4
Experiment 5	Preparation of phenol formaldehyde	CO1,CO2,CO3,CO4
Experiment 6	To Determine the amount of dissolved oxygen in water	CO1,CO2,CO3,CO4
Experiment 7	Preparation of Paracetamol as antipyretic drug.	CO1,CO2,CO3,CO4
Experiment 8	Determination of % of Zinc in brass using standard EDTA Solution.	CO1,CO3,CO4
Demonstration Experiment		
Experiment 09	Verification of Lambert's-Beer's law.	CO1,CO2,CO3,CO4
Experiment 10	Determination of pH of solution	CO1,CO2,CO3,CO4
Experiment 11	.Determination of functional group in organic compound by IR spectroscopy.	CO1,CO2,CO3,CO4

List of Submission:

1.	Minimum number of Experiments: 10

Mapping of COs and Pos:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	-	-	-	2	2	-	1	-	-	1	-	-
CO 2	3	2	-	-	-	2	2	-	1	-	-	1	-	-
CO 3	3	2	-	-	-	2	2	-	1	-	-	1	-	-
CO 4	3	2	-	-	-	2	2	-	1	-	-	1	-	-

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
ISE											

Government College of Engineering, Karad				
First Year (Sem – I) B. Tech. Information Technology				
CE3207 : Programming for problem solving Lab				
Laboratory Scheme:			**Examination Scheme:**	
Practical	2 Hrs/week		ISE	50
Total Credits	1		ESE	25

Prerequisite : Computer fundamentals

Course Outcomes (CO): Students will be able to

1.	Understand the basics of C programming language, including syntax, data types.
2.	Demonstrate the ability to write and execute C programs using control statements.
3.	Solve the real world problems using function, array, strings, and structure.
4.	Develop debugging and testing skills to identify and resolve errors in C programs file handling and graphics.

Course Contents	CO
Implementation of following concepts	
Experiment 1 Introduction to various components of programming environment	CO1
Experiment 2 Decision making statements	CO1
Experiment 3 Loop statements	CO2
Experiment 4 Passing argument to functions	CO2
Experiment 5 1-D and 2-D array and operations on array	CO2
Experiment 6 String using string handling functions	CO3
Experiment 7 Array of structure	CO3
Experiment 8 Call by value and call by reference	CO3
Experiment 9 Dynamic memory allocation using various functions	CO4
Experiment 10 File handling operations	CO4
Experiment 11 C graphics to draw different objects	CO4
Experiment 12 C graphics to demonstrate animation	CO4
List of Submission:	
Minimum number of Experiments : 10	

Mapping of COs and POs

PO → CO ↓	PO 1	PO2	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	-	-	1	-	1	1	-	-	-	-	-	-	2
CO 2	1	2	-	1	-	1	1	-	-	-	-	-	1	-
CO 3	-	1	3	2	1	1	-	-	-	-	-	-	2	-
CO 4	-	1	2	3	-	1	1	-	-	-	-	-	2	-

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
ISE											

Government College of Engineering, Karad				
First Year (Sem – II) B. Tech. Civil Engineering				
CE3208: Engineering Mechanics Lab				
Laboratory Scheme:			**Examination Scheme:**	
Practical	2 Hrs/week		ISE/CA	50
Total Credits	1		ESE	25

Prerequisite :

Course Outcomes (CO): Students will be able to

CO1	To study basic concepts and fundamental laws, force, moment and couple
CO2	To study Varignon's theorem and law of moments, Lami's theorem, free body diagram
CO3	To study the moment of inertia of a Flywheel.
CO4	To study the coefficient of restitution for a given pair of materials.

Course Contents		CO
Experiment 1	**To verify the polygon law forces.**	**CO1**
	Objective: Study basic concepts and fundamental laws, force, moment and couple.	
Experiment 2	**To understand the nature of forces in the members of jib crane.**	**CO1**
	Objective: Study resolution and composition of force, system of forces, resultant.	
Experiment 3	**To verify law of moments using Bell crank lever**.	**CO2**
	Objective: Study Varignon's theorem and law of moments, Lami's theorem, and free body diagram.	
Experiment 4	**To determine the reaction for simply supported beam.**	**CO2**
	Objective: Analysis of simple and compound beams, virtual work method for support reactions.	
Experiment 5	**To determine mass moment of inertia of flywheel.**	**CO3**
	Objective: To determine Moment of inertia of a Flywheel	
Experiment 6	**To calculate the efficiency of simple screw jack.**	**CO3**
	Objective: Study of simple lifting machine using screw jack	
Experiment 7	**To determine the mechanical advantages, velocity ratio &efficiency of a differential wheel and axle.**	**CO3**
	Objective: Study of differential wheel and axle.	
Experiment 8	**To determine the coefficient of restitution for different materials.**	**CO4**
	Objective: To determine the coefficient of restitution for a given pair of materials	
Experiment 9	**Verification of Newton's second law of motion by Fletcher's trolly.**	**CO4**
Dwg. Sheet No. 1	To Find Resultant Force – Min 2 Problems	**CO1**
Dwg. Sheet No. 2	To Find Support Reactions – Min 2 Problems	**CO2**

List of Submission:

1.	Minimum number of Experiments: 08 Drawing Sheets: 02 At least three problems on each unit of theory course.

Mapping of COs and POs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	2	1	-	2	2	-	-	2	3	-	1	1	2	2
CO2	2	1	-	2	2	-	-	2	3	-	1	1	2	2
CO3	2	1	-	2	2	-	-	2	3	-	1	1	2	2

CO4	2	1	-	2	2	-	-	2	3	-	1	1	2	2

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	30	30	30	30	30	30	30	30	30	30	
Task II	10	10	10	10	10	10	10	10	10	10	
Task III	10	10	10	10	10	10	10	10	10	10	
ISE	50	50	50	50	50	50	50	50	50	50	

Government College of Engineering, Karad		
First Year (Sem–II)B. Tech. Civil Engineering		
CE3209 Experiential Learning Lab		
Laboratory Scheme:		**Examination Scheme:**	
Practical	4 Hrs/Week	**ISE**	50
Total Credits	2	**ESE**	25

Course Outcomes (CO):

Students will be able to

CO1	Understand different instrument and their uses.
CO2	Able to choose and handle instruments for different purposes.
CO3	Able to perform basic experiments on construction material.
CO4	Understand process of structural audit and land survey

Course Contents		CO
Experiment 1	Introduction of compression testing machine.	CO1
Experiment 2	Introduction of Universal testing machine.	CO1
Experiment 3	Non-destructive Testing and its types.	CO1
Experiment 4	Determine compression strength of any one structural element such as a column, beam etc. using Rebound Hammer test on damaged or undamaged concrete.	CO3
Experiment 5	Determine the specific gravity of course aggregate by picnometer.	CO3
Experiment 6	Determine the water content of soil by oven dried method.	CO2
Experiment 7	Determination of pH and hardness of water.	CO2
Experiment 8	Determine distance between two station points with the help of chain/tape.	CO3
Project 1	Project work: Visit any old or damaged structure.	CO4
Project 2	Project work: Closed traverse by prismatic compass.	CO4

List of Submission:

1.	List of experiments given above be carried out and drawing sheets be plotted wherever necessary.
2.	Project Report & site visit report

Mapping of COs and POs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	1	-	-	-	1	-	-	1	2	1
CO2	2	2	1	1	3	-	-	-	1	1	-	1	1	2
CO3	3	3	2	2	3	-	-	-	1	2	1	-	2	1
CO4	2	3	2	2	2	2	2	-	3	2	2	1	1	2

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Project 1	Project 2	Avg
Task I	30	30	30	30	30	30	30	30	30	30	30
Task II	10	10	10	10	10	10	10	10	10	10	10
Task III	10	10	10	10	10	10	10	10	10	10	10
ISE	50	50	50	50	50	50	50	50	50	50	50

Government College of Engineering, Karad				
First Year (Sem – II) B. Tech. Civil Engineering				
CE3210: Community Service and Practices (CSP)				
Teaching Scheme			**Examination Scheme**	
Lectures	00 Hrs/Week		ISE	50
Practical	02 Hrs/Week		ESE	-
Total Credits	01		Duration of ESE	**-**

Course Outcomes (CO): After successful completion of course the Students will be able to

CO1	Understand the community needs in which they are living.
CO2	Identify the problems of the community and help to solve them.
CO3	Apply technical knowledge of respective field to train local community.
CO4	Practice national integration and social harmony.

Course Contents		CO	Hours
	Community Service and Practices (CSP): 1. Student has to register for CSP with department coordinator. 2. He/she has to complete one of the following two modules. 3. He/she has to obtain certificate of participation from Head of the department to that effect.		

	MODULE I:
	    The institute has signed MoU with NASSCOM for implementation of digital literacy program (under NDLM - National Digital Literacy Mission). The program shall cover training of school children or village youths on one of the 7 modules designed by NASSCOM such as internet, mobile banking, e-commerce, e-business, use of media like WhatsApp/ linkedin etc. The course details are provided by NASSCOM. The course work of each module consists of presentation of readymade power point slides as a theory and separate practice sessions. The module shall be followed by test and joint certification of successful candidates (institute and NASSCOM). The theory sessions shall be conducted in the respective schools and the practical may be conducted in schools subject to availability of computational facility OR in the computer centre of our institute on weekend. The total duration of the course shall be between 40 to 60 hours.
	    The students shall visit schools covering 20 km surrounding area (rural and municipal schools) and register the school students. The target for each student shall be delivery and certification of one of the modules to a group of 6 school students. Travelling allowance for travel by bus (bus ticket) or sleeper class shall only be admissible to the students at actual subject to prior sanction of Hon. Principal for the activity.
		CO1, CO2, CO3, CO4	40 to 60

	MODULE II He/she should participate in all/few of the following activities and complete at least 60 hours of activities for technology transfer to community within 20 km. The activities shall be declared by respective Head of the department. The list of different CSP activities to be conducted under this module shall be but not limited to the following. The activity has to be conducted under the institute banner and counting of its equivalent duration shall be as Indicated against each. He/she should collect total 60 Hours from CSP activities. 1. Two wheeler maintenance 16 Hrs. 2. Motor cycle repairing 16 Hrs. 3. Electrical wiring 16 Hrs. 4. Plumbing 16 Hrs. 5. Carpentry 16 Hrs. 6. Computer Hardware maintenance 16 Hrs. 7. Radio / T.V. repair 16 Hrs.	**CO1, CO2, CO3, CO4**	60

	8. Rain water harvesting 16 Hrs. 9. Roof water harvesting 16 Hrs. 10. Electric safety 16 Hrs. 11. Electrical Safety 16 Hrs. 12. Constructional Safety 16 Hrs.

Reference Books:

1.	Community Service and Practices Manual, Government of India.
2.	Training Programme on National Programme scheme, TISS.
3.	Case material as Training Aid for field workers, *Gurmeet Hans*.
4.	Social service opportunities in Hospitals, *Kapil K.Krishan*,TISS.
5.	Social Problems in India, *Ram Ahuja.*
6.	National Service Scheme Manual (Revised), 2006 Government of India, Ministry of Youth Affairs and Sports, New Delhi.
7.	University of Mumbai National Service Scheme Manual, 2009
8.	Avhan Chancellor's Brigade - NSS Wing, Training Camp on Disaster Preparedness Guidelines, March, 2012.
9.	Rashtriya Seva Yojana Sankalpana - Prof. Dr. Sankey Chakane, Dr. Pramod / Pabrekar, Diamond Publication, Pune.
10.	National Service Scheme Manual for NSS District Coordinators, National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya.
11	Annual Report of National Service Scheme (NSS) published by Dept. of Higher and Technical Education, Mantralaya.
12	NSS Cell, Dept. of Higher and Technical Education, Mantralaya, UTKARSHA - Socio and Cultural Guidelines.
13	Purushottam Sheth, Dr. Shailaja Mane, National Service Scheme

Useful Links

1.	https://www.youtube.com/watch?v=3o40NbNLoWQ
2.	https://www.youtube.com/watch?v=paJK5X6zqI8&list=PLp4YWOW_llESHogw-coZo7PQdYliF-msj
3.	https://www.youtube.com/watch?v=paJK5X6zqI8&list=PLp4YWOW_llESHogw-coZo7PQdYliF-msj&index=1

Mapping of COs and POs

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1		1	-	-	-		1	1		1	-	-	1	1
CO 2	1	1	-	-	-	1	1	1	1	1	-	-	1	1
CO 3	1	1	-	-	-	2	1	1	1	1	-	-	1	1
CO 4	1	1	-	-	-	1	1	1	1	1	-	-	1	1
CO5	1	1				1		1	1				1	1

Assessment Pattern: (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	-	-	10
Understand	-	-	10
Apply	-	-	20
Analyse	-	-	10
Evaluate	-	-	-
Create	-	-	-
Total	-	-	50

Government College of Engineering, Karad				
Second Year (Sem – III) B. Tech. Civil Engineering				
CE-EC-0101 : Industrial Internship				
Teaching Scheme			**Examination Scheme**	
Lectures			Lectures	
Tutorials	8 Hrs/Week		Tutorials	8 Hrs/Week
Total Credits	8		Total Credits	8

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	**CO**	
	Student is supposed to present technical report on the industrial training or civil engineeringrelated 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 trainingperiod. 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 Conclusion and Recommendations, Photo gallery, References, Appendices	CO1,CO2 &CO3	

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				
First Year (Sem – I) B. Tech. Civil Engineering				
CE-EC-0102: Basics of Civil Infrastructure				

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	01 Hrs/week		ISE	20
Total Credits	04		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite :

Course Outcomes (CO): Students will be able to

CO1	Understand various types of infrastructures.
CO2	Acquire knowledge regarding basics of planning for infrastructure.
CO3	Acquire knowledge regarding basics of execution and maintenance of infrastructure.
CO4	Understand forms of organizations.

	Course Contents	CO	Hours
Unit 1	**Introduction to Infrastructure:-**Definition of Basic Terminologies, Role of Infrastructure In Economic Development, Types of Infrastructure, Goals And Objectives Of Infrastructure Planning. Issues related with infrastructure development.	CO1	(06)
Unit 2	**Introduction of infrastructure systems:-** Water supply and distribution, Transport systems, Energy management, Building infrastructure, Need for making these infrastructures smart.	CO1, CO2	(08)
Unit 3	**Ports and harbors:-** basics of planning of ports and harbors, breakwaters, jetties. **Airport: -** Airport system planning and construction, Components of airport, site selection criteria, airport capacity.	CO2, CO3	(05)
Unit 4	**Railway:-** History of Indian railways, planning surveys, components of railway track ,railway alignment, safety measures, track inspection and maintenance, track drainage, Site selection and facilities for railway stations and yards, High Speed Railways- Modernization of railways.	CO2, CO3	(06)
Unit 5	**Roads and highways: -** Types of pavements, Components of road, materials used for road construction, selection of construction materials, road maintenance, and highway drainage – need. **Bridges: -** Types, Components, Maintenance.	CO2, CO3	(06)
Unit 6	**Forms of Organization:-**Proprietorships, Partnerships, Joint Ventures, Introduction to PPP(Public Private Partnership)	CO4	(05)

Text Books

1.	Justo C. E. G., Khanna S. K., Veeraragavan A., "Highway Engineering" , Nemchand & Bros (10th Edition). 2015.
2.	Kadiyali L. R. and Lal N. B., "Principles and Practices of Highway Engineering", Khanna Publishers (7th Edition). 2013.
3.	Railway And Bridge Engineering, by Vaibhao Sonarkar. ISBN:9789388293969, 9388293967

Reference Books

1.	Wright P. H. and Dixon K., "Highway Engineering", Wiley India Pvt. Ltd., (7th Edition). 2009.
2.	Infrastructure Development & Financing in India. New Century Publications ISBN: 9788177083095, 8177083090
3.	Infrastructure Planning Handbook by Alvin Goodman, Makarand Hastak. McGraw-Hill Education ISBN- 978-0071474948

Useful Links

1.	https://youtube.com/playlist?list=PLyqSpQzTE6M--qyfRKUxehDwVv5q6bzrn
2.	https://youtube.com/playlist?list=PLFGUksPYY9Qp5rLjedeUIwcu13eAeETkh

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	-	-	-	-	1	1	2	-	2	2	1		2	2
CO 2	-	2	1	1	2	1	1	1	2	2	2	2	2	2
CO 3	1	2	2	2	3	-	1	1	2	2	2	2	2	2
CO 4	-	-	1	-	2	1	-	1	2	3	2	2	2	2

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	4	20
Understand	5	4	-
Apply	5	4	10
Analyse	-	4	20
Evaluate	5	4	10
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad		

Government College of Engineering, Karad
First Year (Sem – I) B. Tech. Civil Engineering
CE-EC-0104 Basic of Civil Infrastructure Lab

Laboratory Scheme:			**Examination Scheme:**	
Practical	4 Hrs/week		**ISE**	**50**
Total Credits	4		**ESE**	**50**

Prerequisite :

Course Outcomes (CO): Students will be able to

1	Understand the Residential/Infrastructural Components of Building, Designing, Planning Aspects, and Building Services.
2	Understand the use of different materials and techniques for Infrastructural Projects and Residential Projects.
3	Understand different Projects application and write visit reports.

Course Contents	
Performance 1	Visit to Residential+ Commercial Project and write a report on visit.	CO1,CO2 &CO3
Performance 2	Visit to Public Building Project and write a report on visit.	CO1,CO2 &CO3
Performance 3	Visit to Railway Station and write a report on visit.	CO1,CO2 &CO3
Performance 4	Visit to Airport and write a report on visit.	CO1,CO2 &CO3
Performance 5	Visit to Harbour/Dock and write a report on visit.	CO1,CO2 &CO3
Performance 6	Visit to Road Construction Project and write a report on visit.	CO1,CO2 &CO3
Performance 7	Visit to Bridge and write a report on visit.	CO1,CO2 &CO3
Performance 8	Visit to Power Generation Project and write a report on visit.	CO1,CO2 &CO3

Note:	
1.	*Visit possible site and make report OR demonstrate performance in lab by ITC platform*

Mapping of COs and POs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	-	-	-	2	-	1	1	-	1	-	-	1	1
CO2	2	-	-	-	2	-	1	-	-	1	-	-	1	1
CO3	2	-	-	-	1	-	1	-	-	2	-	-	1	1

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern:

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Avg
Task I	30	30	30	30	30	30	30	30	
Task II	10	10	10	10	10	10	10	10	
Task III	10	10	10	10	10	10	10	10	
ISE	50	50	50	50	50	50	50	50	

Government College of Engineering, Karad				
First Year (Sem – I) B. Tech. Civil Engineering				
CE-EC-0103: Construction Materials				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		MSE	20
Tutorials	01 Hrs/week		ISE	20
Total Credits	04		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite :

Course Outcomes (CO): Students will be able to

CO1	Understand the properties of construction materials.
CO2	Understand the specific use of construction materials.
CO3	Apply the knowledge for selection of materials on field.

	Course Contents	CO	Hours
Unit 1	**Stones:-** History of stones as a construction material, Quarrying of stones (methods only), Properties and uses of principle building stone, Requirement of good building stones, Artificial stones or cast stones, Types of building stones.	**CO1,CO2, CO3**	**(06)**
Unit 2	**Bricks:-** History of bricks as a construction material, Composition of clay bricks, Manufacturing of bricks, Types of bricks, Classification of burnt clay bricks, Strength of bricks, Properties of burnt clay bricks, Special bricks, Hollow bricks or hollow blocks, Fly ash bricks, Field tests for good brick ,Aerated cement concrete bricks.	**CO1,CO2, CO3**	**(07)**
Unit 3	**Timber:-** Structure of a timber tree, Properties of good Timber, Defects of timber, Decay of timber, Seasoning of timber, Preservation of timber.	**CO1,CO2, CO3**	**(06)**
Unit 4	**Cement and Mortar:-** Functions of mortar, Properties of an ideal motor, Properties of motors for various purposes, **Cement:-** Functions of cement ingredients, Composition of Portland cement, Types of cements.	**CO1,CO2, CO3**	**(06)**
Unit 5	**Aggregates and Tiles:-** Properties of fine aggregates and coarse segregates, Sand, artificial sand, Uses of sand. **Tiles:-** Properties of tiles, Use of tiles, Payment blocks and their uses, Types of tiles.	**CO1,CO2, CO3**	**(06)**
Unit 6	**Miscellaneous Materials:-** Glass and its properties, Types of glass and uses, **Plastics:-** Properties of plastics and its uses, Use of aluminium in construction, Admixtures, Paints and its types.	**CO1,CO2, CO3**	**(07)**

Text Books

1.	A Text-Book of Building Construction by by S. P Arora, S. P Bindra. Dhanpat Rai Publication. ISBN 978-8189928803
2.	Building Materials by S.K.Duggal New Age Publishers. ISBN:- 978-9387788398

Reference Books

1.	Civil Engineering Construction Materials by S K Sharma. Khanna Book Publishing Co.(p) Ltd. ISBN13: 9789382609841

Useful Links

1.	https://youtube.com/playlist?list=PLyqSpQzTE6M_RfjEQMK7_L-UvxAMhplUT
2.	https://youtube.com/playlist?list=PL8BA090E69BF01BC2
3.	https://youtube.com/playlist?list=PLk7ptZcI9vmhBh7evUtxAbHe3Ojs_099H

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	-	-	-	-	-	-	-	-	1	2	1	2	1	2
CO 2	-	-	-	-	2	3	3	3	2	2	2	2	1	1
CO 3	3	-	-	2	3	3	2	3	2	2	3	2	2	2

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	4	20
Understand	5	4	-
Apply	5	4	10
Analyse	-	4	20
Evaluate	5	4	10
Create	-	-	-
TOTAL	20	20	60

<table>
<tr><td colspan="5" align="center">**Government College of Engineering, Karad**</td></tr>
<tr><td colspan="5" align="center">**First Year (Sem – I) B. Tech. Civil Engineering**</td></tr>
<tr><td colspan="5" align="center">**CE-EC-0105 : Construction Materials Lab**</td></tr>
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Laboratory Scheme:			Examination Scheme:	
Practical	4 Hrs/week		**ISE**	**50**
Total Credits	**4**		**ESE**	**25**

Prerequisite :

Course Outcomes (CO): Students will be able to

CO1	Understand lab and field tests on brick.
CO2	Monitor quality and application of mortar.
CO3	Understand lab and field tests on aggregates.
CO4	Check the quality of construction materials on field.

Course Contents		CO
Performance 1	Study various bonds in construction stones.	**CO1**
Performance 2	Basic lab tests on stones 1. Water absorption 2. Sieve analysis	**CO1**
Performance 3	Study various bonds in brick construction.	**CO1**
Performance 4	Basic lab tests on bricks 1. Water absorption 2. Crushing test	**CO1**
Performance 5	Preparation and application of cement mortar for plastering and brick wall construction.	**CO1, CO2, CO4**
Performance 6	Study field test on aggregates. 1. Water absorption 2. Sieve analysis 3. Impact value	**CO3**
Performance 7	Study the use and types of scaffolding.	**CO4**
Performance 8	Visit to a cement factory for understanding manufacturing process of cement.	**CO 4**
Performance 9	Visit to a construction site to observe use of construction materials and quality control.	**CO4**

List of Submission:

2.	Minimum number of Performance: Any 5 out of first 7, Any 1 out of 8 and 9.

Mapping of COs and POs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	-	-	2	-	1	2	2
CO2	1	-	-	-	-	-	-	3	2	2	2	2	2	2
CO3	1	-	-	-	-	-	-	-	1	2	-	2	2	2
CO4	2	-	-	-	-	1	-	3	2	2	2	1	2	2

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern:

Skill Level (as per CAS Sheet)	Per. 1	Per. 2	Per. 3	Per. 4	Per. 5	Per. 6	Per. 7	Per. 8	Per. 9	Avg
Task I	30	30	30	30	30	30	30	30	30	
Task II	10	10	10	10	10	10	10	10	10	
Task III	10	10	10	10	10	10	10	10	10	
ISE	50	50	50	50	50	50	50	50	50	