ACADEMIC YEAR 2026-27

FIRST YEAR B.TECH ELECTRICAL ENGINEERING

SYLLABUS FOR

SEMISTER-I

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

Government College of Engineering, Karad				
First Year(Sem-I) B. Tech. Electrical Engineering				
EE3101-Engineering 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	Understand construction, working and applications of battery.
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	Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.

	Course Contents	CO	Hrs
Unit 1	**Battery Science** Battery Technology Introduction - Galvanic cell, electrode potential, EMF of the cell and cell representation. Batteries and their importance, Classification of batteries- primary, secondary and reserve batteries with examples. Electrical Vehicle Battery Construction, working advantages and disadvantages of EV Car. Construction, working and applications of Ni-Cd, Lithium based batteries – Li-ion & Li-poly, Metal Air Battery, Zinc Chloride battery– chemical reaction during charging and discharging of lead acid cell – applications – charging of Batteries – precautions during charging and discharging – trickle charging – indications of full charged battery – capacity of a battery – factors affecting the capacity of the battery – Ampere-Hour efficiency – Watt- Hour efficiency– flat plate battery – tubular battery – applications.	CO1 CO2	**(07)**
Unit 2	**Electrochemistry** Introduction , Galvanic cell , Electrode potential, Single electrode potential, Standard electrode potential, Factor affecting electrode potential Nature of electrode, Concentration of ionic solution, Temperature, Electrochemical series, Application of electrochemical series, Electromotive force (EMF), Nernst equation, Fuel cells – Hydrogen – Oxygen fuel cell; Advantages and Applications. Electrochemistry Nernst Equation and application.	CO1 CO2	(07)
Unit 3	**Engineering Advanced Materials** Conducting Polymers: Synthesis & Mechanism of conduction in poly acetylene. Biodegradable polymers: Introduction and their requirements. Synthesis and properties of Poly lactic acid. Applications of biodegradable polymers in medical industry. Semiconducting material: - n- type & p-type semiconductors, Preparations, properties and applications of semiconductors, Magnetic Properties. Properties ofPoly 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. Optimum levels of pollution. Significance and determination of COD and BOD. Solid waste treatment of collection of NKP. Greenhouse effect and global Warming. E-Waste. Radioactive pollution. Basic principles of green chemistry. Various green chemical approaches – Microwave synthesis, Bio catalysed reactions, Phase transfer catalysis.	CO1 CO5	(07)
Unit 5	**Storage Device Science :** Fuel Cells- Differences between battery and a fuel cell, Classification of fuel cells - based on type of fuel, Construction, working and applications of solid oxide fuel cell. Hydrogen cells, Photo conductive cells, Photo voltaic cells, characterization– super capacitor – applications rechargeable battery – applications – maintenance free battery – applications	CO1 CO5	(07)
Unit 6	**Nanomaterials:-** Introduction, Nanomaterials- preparation of CNT by different methods, CNT properties	CO1 CO4	(07)

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

	and applications, size dependent properties (Surface area, Electrical, Optical, Catalytic and Thermal properties). Synthesis of nanomaterials: Top down and bottom up approaches,Carbonnano tubes and graphenes – properties and applications. Characterization method for Nano materials, SEM (Scanning Electron Microscope), AFM (Atomic Force Microscopy), STM ('Scanning Tunnelling Microscopy), Chemical process required for PCB & IC.		

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, DhanpatRai 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&Pushpalyengar.,- "Chemistry for Engineering Students", Subash Publications, Bangalore. 10th Edition, 2020.
5.	"Modern Electrochemistry 2A: Fundamentals of Electrodics" by J O'M Bockeris and M G-Aldeco
6.	Handbook of Carbon Nanotubes Jiji Abraham, Sabu Thomas, NandkumarKalarikkal

Useful Links	
1.	https://www.youtube.com/watch?v=3O6OfCaVadI&list=PLm_MSClsnwm9p_yaZ8zlW1LxkK7_n98gD
2.	https://www.youtube.com/watch?v=kID3n_-kees
3.	https://www.youtube.com/watch?v=EvoN6vmiCfI&list=PLKSeO-scpOo33zdDN0i2uw1Xh3zh_UfGO
4.	https://www.youtube.com/watch?v=YFd0kb9Nwt0

Mapping of COs and Pos

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	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

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

Government College of Engineering, Karad

First Year (Sem-I) B. Tech Electrical Engineering

EE3102: Linear algebra and Calculus

Teaching Scheme			Examination Scheme		
Lectures	03Hrs/week		**MSE**		20
Tutorials	01Hrs/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	Expand the function of real variables. Evaluate Indeterminate Forms
CO3	Deal with functions of several variables, Jacobian 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 Eigenvectors and their properties, Cayley-Hamilton Theorem (without proof), Powers of matrix, diagonalization of matrices, Orthogonal transformation.	CO1	(7)
Unit 3	**Expansion of Functions and Indeterminate Forms:** Taylor's Series, Maclaurin's series, expansion using standard expansions, Indeterminate forms, L-Hospital rule, Evalution of limits and applications.	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, Maxima and minima of function of two variables, Lagrange's method of undermined multipliers	CO3	(7)
Unit 6	**Vector Calculus:** 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, independence of vectors. 3. Eigen values and Eigen vectors. 4. Powers of matrix and Diagonalization of matrices. 5. Expansion of functions and Indeterminate Forms. 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 and sons,Advanced Engineering Mathematics22nd edition, 2018.
2.	DebashisDatta Textbook of Engineering MathematicsNew Age International Publication,6th edition 2006.
3.	Ravish R..Singh, MukulBhatt.,Engineering Mathematics A Tutorial Approach, Tata McGraw Hill 2010.

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

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.ManishGoyal, Textbook of Engineering MathematicsLaxmi 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	PSO 1	PSO 2
CO 1	2	2	1	2	-	-	-	-	-	-	1	-	-
CO 2	2	2	1	1	-	-	-	-	-	-	1	-	-
CO 3	2	2	1	1	-	-	-	-	-	-	1	-	-
CO 4	2	2	1	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

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

Government College of Engineering, Karad

First Year (Sem – I) B. Tech. Electrical Engineering

EE3103: Basic Electronics Engineering

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 : Mathematics, Computer Fundamentals

Course Outcomes (CO): Students will be able to

CO1	Understand fundamentals of semiconductor devices
CO2	Demonstrate knowledge of diode circuits.
CO3	Understand transistor circuits.
CO4	Acquire knowledge of MOSFET

	Course Contents	CO	Hours
Unit 1	**Introduction to Semiconductor Devices :** N-Type and P-Type Semiconductors, The PN Junction. Diode, PNP and NPN transistors, MOSFET and SCR constructional features only	CO1	(08)
Unit 2	**Types of Diodes** Ideal versus practical diodes, resistance levels, diode equivalent circuits, transition and diffusion capacitance, reverse recovery time, diode specification sheet, zener diode, Light Emitting diode, Tunnel diode, schottky diode, varicap diode	CO1	(07)
Unit 3	**Diode Circuits :** Diode Models, Half-Wave Rectifiers, Full-Wave Rectifiers. Clippers, Clampers, Zener Diode as voltage regulators, Voltage multiplier circuits, Practical Applications of diode circuits.	CO2	(05)
Unit 4	**Transistors:** Bipolar Junction Transistor Introduction, Transistor construction, Operation, Common-base configuration & characteristic, Transistor Amplifying action, Common-Emitter configuration & characteristic, Common collector configuration & characteristic, Limits of operation, study of Transistor data sheet	CO1	(07)
Unit 5	**Transistor Amplifier Circuits :** Class A amplifier, Transformer-Coupled Class A amplifier, Class B amplifier operation, Class B amplifier circuits, Amplifier distortion, Class C and Class D amplifier. Push Pull Amplifier.	CO3	(06)
Unit 6	**MOS Field-Effect Transistors Device Structure and Physical Operation:** Current-Voltage Characteristics, MOSFET Circuits at DC, The MOSFET as an Amplifier and as a Switch, Biasing in MOS Amplifier Circuit.	CO4	(07)

Text Books

1. Thomas. L. Floyd ,"Electronics Devices" , 9th Edition, Pearson, 2021. (Unit 1,2)
2. Albert Malvino& David J. Bates, "Electronic Principles", Tata McGraw Hill, 7th Edition 2007
3. Floyd, "Electronic Devices", PHI, 7th Edition.

Reference Books

1. Sedra, Smith, 'Microelectronic Circuits', Oxford University Press, fifth edition, 2004.
2. Paul Horowitz and Winfield Hill, 'The art of electronics', Cambridge university press, third edition, 2011.

Useful Links

1. http://nptel.ac.in/courses/117105080/Prof. D. Roychoudhury IIT Kharagpur.
2. http://nptel.ac.in/courses/117106086/Prof. S. Srinivasan IIT Madras.
3. https://onlinecourses.nptel.ac.in/noc21_ee32/preview Prof. HardikJeetendraPandyaIISc Bangalore.

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

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

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

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

CHAIRMAN
Board of Studies
Department of Electrical Engineering
Government College of Engineering, Karad

Government College of Engineering, Karad

First Year (Sem – I) B. Tech. Electrical Engineering

EE3104: Programming for Problem Solving

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

CO1	Understand Computer fundamentals and algorithm.
CO2	Develop ability to analyze problems using Control Statements and Functions.
CO3	Learn advanced features like Array, String and Structure.
CO4	Apply concept of Pointer and File Handling.

		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/Pseudo code 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	(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	(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.	CO3, 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.	YashvantKanetkar, "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,1988.
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/SatyadevNandkumar

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

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

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

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

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

Government College of Engineering, Karad

First Year (Sem – I) B. Tech. Electrical Engineering

EE3105: Design Thinking

Teaching Scheme			Examination Scheme	
Lectures	01 Hrs/week		**MSE**	--
Practical	02Hrs/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	

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Ka

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.	BalaRamadurai, "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 YourOrganization".
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. BalaRamadurai/ 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	PSO 1	PSO 2
CO 1	1	2	1	1	-	1	-	-	-	-	1	1	1
CO 2	1	1	2	2	-	-	-	1	-	-	1	2	1
CO 3	1	1	3	2	2	-	-	-	2	2	1	1	1
CO 4	1	2	2	1	1	1	-	-	-	-	1	2	1

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

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

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	25	25	25	25	25	25	25	25	25	25	25
Task II	15	15	15	15	15	15	15	15	15	15	15
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

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Kara

Government College of Engineering, Karad				
First Year (Sem – I) B. Tech. Electrical Engineering				
EE3107 : Programming for problem solving Lab				
Laboratory Scheme:			**Examination Scheme:**	
Practical	02 Hrs/week		**ISE**	25
Total Credits	01		**ESE**	25

Prerequisite : Computer fundamentals

Course Outcomes (CO): Students will be able to

CO1	Understand the basics of C programming language, including syntax, data types.
CO2	Demonstrate the ability to write and execute C programs using control statements.
CO3	Solve the real world problems using function, array, strings, and structure.
CO4	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	CO2
Experiment 3	Loop statements	CO2
Experiment 4	Passing argument to functions	CO3
Experiment 5	1-D and 2-D array and operations on array	CO3
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	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO 1	3	-	-	1	-	1	1	-	-	-	1	-	2
CO 2	1	2	-	1	-	1	1	-	-	-	1	1	-
CO 3	-	1	3	2	1	1	-	-	-	-	1	2	-
CO 4	-	1	2	3	-	1	1	-	-	-	1	2	-

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

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

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	15
Task II	05	05	05	05	05	05	05	05	05	05	05
Task III	05	05	05	05	05	05	05	05	05	05	05
ISE	25	25	25	25	25	25	25	25	25	25	25

CHAIRMAN
Board of Studies
Department Of Electrical Engineerin
Government College of Engineering, Ka

Government College of Engineering, Karad				
First Year (Sem-I) B. Tech. Electrical Engineering				
EE3108 : Professional Communication Skills				
Laboratory Scheme			Examination Scheme	
Lecture	1Hrs/week		ISE	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.	KulBhushan 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	

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

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

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	10	05
Understand	15	05
Apply	15	10
Analyze	10	05
Evaluate	-	-
Create	-	-
TOTAL	50	25

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

Government College of Engineering, Karad			
First Year (Sem-I)B.Tech. Electrical Engineering			
EE3110 : Yoga			
Laboratory Scheme:			Examination Scheme:
Practical	2 Hrs/Week		ISE 50
Total Credits	1		ESE -

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: • योगाचाइतिहास: योगसूत्रग्रंथ, पतंजलीमुनी. • अष्टांगयोग: १. यम: अहिंसा,सत्य,अस्तेय,ब्रम्हचर्य,अपरिग्रह २. नियम:शौच,संतोष,तपास,स्वाध्याय,ईश्वरप्रणीधान ३. आसन: विविधस्थितीतीलआसने ४. प्राणायाम : विविधप्रकार ५. प्रार्थना ६. धारणा: एकाग्रचित्त ७. ध्यान ८. समाधी वरीलअष्टांगयोगाचेथोडक्यातमहत्व • सूर्यनमस्कार: महत्ववफायदे • प्रात्यक्षिक : प्रार्थना,सूर्यनमस्कार,आसने,प्राणायामवध्यानयाचासराव	CO1 CO2 CO3 CO4

Reference Books:	
1.	Nagendra,H.R.&Nagarathna,R.(2002).SamagraYogaChikitse.Bengaluru: SwamiVivekanandaYogaPrakasana.
2.	Kumar,Ajith.(1984)YogaPravesha.Bengaluru:RashtrothannaPrakashana.
3.	D.MJyoti,YogaandPhysicalActivities(2015)lulu.com3101,Hillsborough,NC27609,UnitedStates.
4.	Uppal,A.K.(1992).PhysicalFitness.NewDelhi:FriendsPublication.

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

Mapping of COs and Pos:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO1	-	-	-	-	-	2	2	2	3	2	2	-	-
CO2	-	-	-	-	-	2	2	2	3	2	2	-	-
CO3	-	-	-	-	-	2	2	2	3	2	2	-	-
CO4	-	-	-	-	-	2	1	2	1	1	2	-	-

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

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.

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Kar

Government College of Engineering, Karad				
First Year (Sem- I) B. Tech Electrical Engineering				
MS3112: Makers Space Laboratory I				
Laboratory Scheme			**Examination Scheme**	
Practical	04 Hrs/week		**ISE**	75
			ESE	25
Total Credits	02			

Prerequisite: Basic concepts of Physics, Chemistry and Mathematics

Course Outcomes (CO): Students will be able to

CO1	Use basic engineering tools and laboratory equipment.
CO2	Integrate mechanical, electrical, electronic, civil, and computing concepts.
CO3	Prepare technical documentation and engineering reports.
CO4	Work collaboratively in multidisciplinary teams.

Course Contents

Module 1 (Civil Domain)

- Smart Sustainable Campus Planning
- Water and Air Quality Parametric analysis
- Road Intersection and Traffic Congestion Planning
- Waste Identification and Recycling/Reusing/Energy Generation Ideas

Module 2 (Mechanical Domain)

- Workshop and Fabrication Practices
- CAD and Product Design
- Mechanical-Electrical Integration
- Smart Structural Prototype

Module 3 (Electrical Domain)

- Electrical Safety, Tools and Basics Circuits
- Electrical Machines and Drives
- Renewable Energy Systems
- Electrical-Electronics Integration
- Smart Energy Prototype

Module 4 (E&TC Domain)

- Components in electronics and its characteristics, resistor, capacitor, inductor, transistor, diode, LED, etc.
- Basic electronics instruments handling
- Embedded systems
- PCB designing (Power supply designing)

Module 5 (IT Domain)

- Python Programing
- Raspberry Pi and Arduino IDE Installation, Setup and Programming
- Website Development
- Database Management System and Data Visualization Techniques

Module 6 (Project Management, Sustainability, and IPR)

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

- Introduction to Agile methodologies, teamwork, and project management tools.
- Importance of documentation in engineering projects.
- Fundamentals of sustainability, sustainability leadership, and carbon footprint analysis.
- Overview of Intellectual Property Rights (IPR), including patents, copyrights, and trademarks.

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
CO1	2	1	–	1	3	–	–	–	–	–	–
CO2	3	2	2	1	2	–	–	–	–	–	–
CO3	–	–	–	–	1	–	–	–	–	3	–
CO4	–	–	–	–	–	–	–	–	3	2	1

Guideline for Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	-	-
Understand	15	5
Apply	15	5
Analyse	15	5
Evaluate	15	5
Create	15	5
TOTAL	75	25

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Kara

Government College of Engineering, Karad				
First Year (Sem-I) B. Tech. Electrical Engineering				
EE3113-Engineering Chemistry Lab				
Laboratory Scheme:			**Examination Scheme:**	
Practical	2 Hrs/Week		**ISE**	50
Total Credits	1		**ESE**	25

Course Outcomes (CO): After completion of course the Students will be able to	
CO1	Analyse& 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	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	-	-

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad

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	25	25	25	25	25	25	25	25	25	25	25
Task II	15	15	15	15	15	15	15	15	15	15	15
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

CHAIRMAN
Board of Studies
Department Of Electrical Engineering
Government College of Engineering, Karad