MITE
Invent Solutions

MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING
(A Unit of Rajalaxmi Education Trust®, Mangalore)
Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi
Accredited by NAAC with A+ Grade & ISO 9001:2015 Certified Institution

SCHEME & SYLLABUS
I/II SEMESTER B.E. PROGRAMS

2023 Scheme

(W.E.F 2023 Admission Students)

Vision

*"To attain perfection in providing **Globally Competitive Quality Education** to all our Students and also benefit the global community by using our strength in **Research and Development**"*

Mission

*"To establish world class educational institutions in their respective domains, which shall be C**enters of Excellence** in their stated and implied sense. To achieve this objective we dedicate ourselves to meet the challenges of becoming **Visionary and Realistic**, **Sensitive and Demanding**, **Innovative and Practical,** Theoretical **and Pragmatic;** ALL at the same time"*

Abbreviations

SI. NO.	Abbreviations	Meaning
1	VTU	Visvesvaraya Technological University
2	AI	Artificial Intelligence & Machine Learning
3	AE	Aeronautical Engineering
4	CS	Computer Science & Engineering
5	IC	CS: IoT & Cyber Security with Block chain Technology
6	CI	CSE: Artificial Intelligence & Machine Learning
7	CV	Civil Engineering
8	EC	Electronics & Communication Engineering
9	IS	Information Science & Engineering
10	ME	Mechanical Engineering
11	MT	Mechatronics Engineering
12	ESCC	Engineering Science Common Course
13	BSCC	Basic Science Common Course
14	HMCC	Humanity & Social Science Common Course
15	CIE	Continuous Internal Evaluation
16	SEE	Semester End Examination

INDEX

MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

(A Unit of Rajalaxmi Education Trust®, Mangalore)
Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi
Accredited by NAAC with A+ Grade & ISO 9001:2015 Certified Institution

I Semester Physics Cycle

Sl. No	Course Code	Course Title	Category	Teaching Dept.	Teaching Hours /Week			Examination (Marks)				Credits
					L	T	P	Hrs	CIE	SEE	Total	
1	23BSCC101	Engineering Physics	Basic Science Courses	Physics	3	0	2	3	50	50#	100	4
2	23BSCC102	Engineering Mathematics - I	Basic Science Courses	Mathematics	3	2	0	3	50	50#	100	4
3	23ESCC104	Fundamentals of Electronics Engineering	Engineering Science Courses	Electronics & Communication Engg.	3	0	2	3	50	50#	100	4
4	23ESCC105	Engineering Graphics	Engineering Science Courses	Mechanical/ Civil Engg.	2	0	2	3	50	50#	100	3
5	23ESCC106	Fundamentals of AI & Cyber Security	Engineering Science Courses	CS&E/allied Programs	3	0	0	3	50	50#	100	3
6	23ESCC107	Fundamentals of Civil Engg & Engineering Mechanics	Engineering Science Courses	Civil Engg.	2	0	0	3	50	50#	100	2
7	23HMCC108/109	Kannada (Balake/ Samskrutika)	Humanities & Social Sciences	Humanities	1	0	0	2	50	50#	100	1
											Total Credits	**21**

#SEE is to be conducted for 100 marks & Scaled down to 50 marks

I SEMESTER Chemistry Cycle

Sl. No	Course Code	Course Title	Category	Teaching Dept.	Teaching Hours /Week			Examination (Marks)				Credits
					L	T	P	Hrs	CIE	SEE	Total	
1	23BSCC110	Engineering Chemistry	Basic Science Courses	Chemistry	2	0	2	3	50	50#	100	3
2	23BSCC102	Engineering Mathematics -I	Basic Science Courses	Mathematics	3	2	0	3	50	50#	100	4
3	23ESCC111	Computational Thinking & Programming	Engineering Science Course	CS&E/allied Programs	3	0	2	3	50	50#	100	4
5	23ESCC112	Fundamentals of Electrical Engineering	Engineering Science Course	Electronics & Communication Engg.	3	0	0	3	50	50#	100	3
4	23ESCC113	Fundamentals of Mechanical Engineering	Engineering Science Course	Mechanical Engg.	2	0	0	2	50	50#	100	2
6	23ESCC114	Design Thinking	Engineering Science Course	Respective department	1	0	2	2	50	50#	100	2
7	23HMCC115	Professional Communication	Humanities & Social Sciences	Humanities	1	0	2	2	50	50#	100	2
											Total Credits	**20**

SEE is to be conducted for 100 marks & Scaled down to 50 marks

II Semester Physics Cycle

Sl. No	Course Code	Course Title	Category	Teaching Dept.	Teaching Hours /Week			Examination (Marks)				Credits
					L	T	P	Hrs	CIE	SEE	Total	
1	23BSCC101	Engineering Physics	Basic Science Courses	Physics	3	0	2	3	50	50#	100	4
2	23BSCC103	Engineering Mathematics- II	Basic Science Courses	Mathematics	3	2	0	3	50	50#	100	4
3	23ESCC104	Fundamentals of Electronics Engineering	Engineering Science Courses	Electronics & Communication Engg.	3	0	2	3	50	50#	100	4
4	23ESCC105	Engineering Graphics	Engineering Science Courses	Mechanical/Civil Engg.	2	0	2	3	50	50#	100	3
5	23ESCC106	Fundamentals of AI & Cyber Security	Engineering Science Courses	CS&E/allied Programs	3	0	0	3	50	50#	100	3
6	23ESCC107	Fundamentals of Civil Engg & Engineering Mechanics	Engineering Science Courses	Civil Engg.	2	0	0	3	50	50#	100	2
7	23HMCC108/109	Kannada (Balake/ Samskrutika)	Humanities & Social Sciences	Humanities	1	0	0	2	50	50#	100	1
										Total Credits		**21**

#SEE is to be conducted for 100 marks & Scaled down to 50 marks

II SEMESTER Chemistry Cycle

Sl. No	Course Code	Course Title	Category	Teaching Dept.	Teaching Hours /Week			Examination (Marks)				Credits
					L	T	P	Hrs	CIE	SEE	Total	
1	23BSCC110	Engineering Chemistry	Basic Science Courses	Chemistry	2	0	2	3	50	50#	100	3
2	23BSCC102	Engineering Mathematics-II	Basic Science Courses	Mathematics	3	2	0	3	50	50#	100	4
3	23ESCC111	Computational Thinking & Programming	Engineering Science Course	CS&E/allied Programs	3	0	2	3	50	50#	100	4
5	23ESCC112	Fundamentals of Electrical Engineering	Engineering Science Course	Electronics & Communication Engg.	3	0	0	3	50	50#	100	3
4	23ESCC113	Fundamentals of Mechanical Engineering	Engineering Science Course	Mechanical Engg.	2	0	0	2	50	50#	100	2
6	23ESCC114	Design Thinking	Engineering Science Course	Respective department	1	0	2	2	50	50#	100	2
7	23HMCC115	Professional Communication	Humanities & Social Sciences	Humanities	1	0	2	2	50	50#	100	2
											Total Credits	**20**

#SEE is to be conducted for 100 marks & Scaled down to 50 marks

ENGINEERING PHYSICS			
Semester	I/II	CIE Marks	50
Course Code	23BSCC101	SEE Marks	50
Teaching Hours/Week (L:T:P)	3:0:2	Exam Hrs	03
Total Hours	64	Credits	04

Course Learning Objectives:

This course is designed to

1. Impart fundamental principles of Physics governing devices and some components of modern science and latest technologies as applicable to engineering disciplines.
2. Strengthen the essential knowledge of mechanical and electrical properties of materials and their behavior under external conditions, to use them for Engineering Applications.
3. Introduce Quantum mechanics to understand the basic principles of Quantum computing used in advanced computation.
4. Support critical and qualitative analysis of optoelectronics, sensors & transducers, mechanical and electrical properties by integrating appropriate laboratory experiments.

Module 1 : Fundamentals of Optoelectronic devices	No. of Hrs: 13

Lasers - Expression for energy density using Einstein coefficients (derivation), Condition for laser action, Requisites for laser system, Construction and working of He-Ne Laser, Advantages and its limitations. Application of laser: Laser in range finder. Numerical Problems.

Optical Fibers: Structure, Principle and light guiding mechanism, Acceptance angle and Numerical aperture (derivation), V-number and Modes of propagation (qualitative), Types of optical fibers and their characteristics, Attenuation and its types, Application of optical fiber: Point-point communication, Numerical Problems.

Lab component/Activity(s)

1. Determine the wavelength of laser using diffraction.
2. Estimation of AA to determine the range of usable angles of an OFC.
3. Laser diode characteristics.

Module 2: Sensors, Transducers, and Actuators	No. of Hrs: 13

Sensors - Introduction, Classification of sensors with examples, Characteristics, Construction and working of Photo-resistive sensor and Thermistor, their applications (qualitative). Numerical Problems.

Transducers: Introduction to Transducers, Types of Transducers. Principle, construction and working of Linear Variable Differential Transformer, Difference between sensor and transducer.

Actuators: Introduction to Actuators, Types of Actuators, Working principle of piezoelectric actuator.

Lab component/Activity(s)

1. Determine the photosensitivity of the photodiode under reverse bias condition.
2. Estimation of β- constant of a Thermistor for thermal sensors.
3. Draw the Thermistor characteristics of PTC and NTC thermistors.

Module 3: Mechanical Properties of Materials and Application	**No. of Hrs: 13**
Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio, Factors affecting the elastic properties. Torsion of a cylinder: Qualitative discussion on Torsion of cylinder and mention the expression for a couple per unit twist of a solid cylinder, Cantilever (derivation of expression with fundamentals of bending of beams), Numerical Problems **Lab component/Activity(s)** **1.** Determine the Young's modulus of a given beam. **2.** Determine the rigidity modulus of a given metallic wire.	
Module 4 : Electrical Properties of Materials	**No. of Hrs: 15**
Conductors: Quantum Free Electron Theory of Metals, Fermi-energy, Density of States and electron concentration (Qualitative). Fermi factor, Variation of Fermi factor with temperature, Expression for electrical conductivity (derivation), Numerical problems. **Semiconductors**: Expression for the electron and hole concentrations, Expression for electrical conductivity in semiconductor (derivation), Hall effect, expression for Hall coefficient (derivation) Numerical Problems. **Dielectrics:** Polarization and its types. Internal field in solids, Clausius–Mossotti equation (Derivation), Numerical Problems. **Lab component/Activity(s)** **1.** Determination of semiconductor type and carrier concentration using Hall Effect. **2.** Determine the sheet resistance of given conducting substrate. **3.** Determine the Fermi energy of conducting wire to know its usability as ohmic contacts. **4.** Determine the dielectric constant of given capacitor.	
Module 5: Introduction to Quantum Mechanics & Quantum Computing	**No. of Hrs: 10**
Quantum Mechanics: Heisenberg Uncertainty principle and its significance, wave function- its significance, Dirac notation and Normalization of wave function, Schrodinger wave equation (qualitative), Application of Schrödinger wave equation for a particle in 1D infinite height potential well: Eigen states and Eigen values, Numerical Problems. **Principles of Quantum Information & Quantum Computing:** Introduction, Moore's Law, Differences between Classical & Quantum computing, Qubit and its properties, Representation of qubit as Bloch sphere, Types of Qubits - Single and Two qubits with one transformation operation for each.	
Course Outcomes: At the end of the course, the student will be able to **CO1:** **Discuss** the fundamental concepts associated with electrical and mechanical properties of materials in Lasers, optical fibers, devices used in the emerging technologies, quantum mechanics and quantum computing. **CO2:** **Derive** the standard expressions relating the important key terms in electrical and mechanical properties of materials, Lasers, optical fibers and quantum mechanics. **CO3:** **Apply** the conceptual knowledge of quantum mechanics, electrical and mechanical properties of materials, lasers, optical fibers, sensors, transducers and actuators in cutting edge technologies. **CO4:** **Solve** numerical problems in electrical and mechanical properties of materials, Lasers, optical fibers, electronic devices, quantum mechanics and quantum computing.	

CO5: **Demonstrate** the characteristics of materials and electronic devices by conducting experiments and write reports based on the analysis of the experimental observations.

TEXT BOOKS

1. Gaur and Gupta. (2012). *Engineering Physics* (2012 edition). Dhanpat Rai Publications.
2. M.N. Avadhanulu & P.G. Kshirsagar. (2014). *A textbook of Engineering Physics* (10th revised edition). Chand & Company Ltd, New Delhi.
3. S. P. Basavaraju. (2018) *A detailed text book of Engineering Physics* (2018 edition). Subhas Stores

REFERENCE BOOKS

1. K R Nambiar. (2004). *Lasers: Principles, Types and Applications* (2004 edition). New Age Publishers.
2. Gerd Keiser. (2017). *Optical fiber communication (SIE)* (5th edition). McGraw Hill Book Co.
3. D. Patranabis. (2003). *Sensors and Transducers* (2nd edition). PHI Learning.
4. S. Timoshenko and J. N. Goodier. (2001). *Theory of elasticity* (2nd edition). McGraw Hill Book Co.
5. Parg K Lala. (2020). *Quantum Computing: A Beginner's Introduction* (2020 edition). McGraw Hill Book Co.

Web links:

1. LASER, https://nptel.ac.in/courses/115/102/115102124/
2. Optical fiber, https://www.youtube.com/@fiberoptics4534
3. Sensors, https://youtu.be/nE1C4ghfvac?si=snq68lV8bDhNpU3c
4. Mechanical Properties, https://youtu.be/PtEOFJGM2_I
5. Electrical properties, https://www.youtube.com/watch?v=sobqX-8kgOI
6. Quantum Computing, https://youtu.be/7WSe4QA8Gts

ENGINEERING MATHEMATICS - I			
Semester	I	CIE Marks	50
Course Code	23BSCC102	SEE Marks	50
Teaching Hours/Week (L:T:P)	3:2:0	Exam Hrs	3
Total Hours	56	Credits	4

Course Learning Objectives: This course is designed to

1. Establish a foundation of modeling dynamical systems to obtain their solution by Analytical and Numerical methods
2. Impart knowledge of various matrix methods and techniques for solving system of linear equations & ordinary differential equations
3. Build a strong foundation in Vector Space and Linear transformation

Module 1 : Ordinary Differential Equations	No. of Hrs: 12

Ordinary Differential Equations: First-order first-degree ordinary differential equations-application to solve simple engineering and scientific problems.

Numerical Solution of Ordinary Differential Equations: Errors and approximations, order of convergence, Modified Euler's method, and Runge - Kutta method of fourth order to solve simple engineering and scientific problems.

Module 2: Second Order Linear Differential Equations	No. of Hrs: 12

Second-Order Linear ODE's: Second-order linear ODE's with constant coefficients – Solution by Inverse differential operator - $e^{ax}, sinax/cosax, e^{ax}f(x)$. Application to Oscillations of a mass spring system and L-C-R circuit.

Numerical Solution of Second Order Linear ODE: Runge-Kutta method of fourth order and Milnes Predictor-Corrector method to solve problems on oscillations of a Mass-Spring system and L-C-R circuits.

Module 3: Matrix Algebra	No. of Hrs: 10

Matrix Algebra: Solution to system of linear equations. Elementary row transformation of a matrix, Rank of a matrix. Gauss-Elimination method. Approximate solution by Gauss-Seidel method. Solution of system of ordinary differential equations by Matrix method.

Module 4 : Vector Spaces	No. of Hrs: 12

Vector spaces: Definition and examples, subspace, Linearly independent and dependent sets, linear span, Basis and dimension, Inner product spaces, Projection and Orthogonality.

Module 5: Linear Transformation	No. of Hrs: 10

Linear transformations: Definition and examples, Matrix representations of a linear transformation. Change of coordinates and change of basis, Rank-Nullity theorem, Rank and nullity of a linear

transformation, Eigenvalue and Eigenvector, Rayleigh power method and Diagonalization of a matrix.

Course Outcomes: At the end of the course, the student will be able to:

CO1: Illustrate the knowledge of fundamental concepts of First-order first-degree ordinary differential equations, Second-order linear differential equations, and Linear algebra

CO2: Apply appropriate methods to solve given problems related to first order- first degree ordinary differential equations, and Second order linear differential equations, based on the acquired knowledge

CO3: Use suitable methods to solve problems allied with linear algebra based on the gained knowledge

CO4: Solve engineering problems related to First-order first-degree ordinary differential equations, Second order Linear differential equations, and Linear Algebra

TEXTBOOKS

1. N.P Bali and Manish Goyal. (2022). *A textbook of Engineering Mathematics* (10th ed.). Laxmi Publications
2. Gilbert Strang. (2023). *Introduction to Linear Algebra (*6th ed.). Wellesley – Cambridge Press

REFERENCE BOOKS

1. James Stewart. (2012). *Calculus: Early Transcendentals* (7th ed.). Cengage Learning.
2. E. Kreyszig. (2018). *Advanced Engineering Mathematics (*10th ed.). John Wiley & Sons.
3. Gerald Farin And Dianne Hansford. (2021). *Practical Linear Algebra (*4th ed.). CRC Press.
4. Steven J. Leon. (2020). *Linear Algebra with Applications (*10th ed.). Pearson.

Web links:

1. Differential equations
NPTEL
https://www.youtube.com/watch?v=ES741wq3APA&list=PLo2fuKadGpUTmZX6ubb3dIB7zrhs8Eyj8&index=1
MIT Learn Differential Equations MIT courseware
https://www.youtube.com/watch?v=ZvL88xqYSak&list=PLUl4u3cNGP63oTpyxCMLKt_JmB0WtSZfG&index=1

2. Linear Algebra - http://www.infocobuild.com/education/audio-video courses/mathematics/AdvancedMatrix Theory-IISc-Bangalore/lecture-18.html

ENGINEERING MATHEMATICS - II			
Semester	II	CIE Marks	50
Course Code	23BSCC103	SEE Marks	50
Teaching Hours/Week (L:T:P)	3:2:0	Exam Hrs	3
Total Hours	56	Credits	4

Course Learning Objectives: The course will

1. Impart the knowledge of derivatives of multivariable functions, Vector differentiation and their applications in analyzing engineering and scientific problems
2. Develop systematic understanding of partial differential equations and its applications in solving engineering problems
3. Provide a comprehensive understanding of multiple integrals by extending the concept of single-variable integration to higher dimensions along with exploring their engineering applications
4. Build a strong foundation in probability theory essential to solve real world random phenomena

Module 1: Partial Differentiation and Vector differentiation	No. of Hrs: 12

Partial Differentiation: Partial derivatives, Total Derivative, Maxima and Minima.

Vector differentiation: Scalar and Vector fields, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Solenoid vector, Curl of a vector field, Irrotational vector, physical interpretation of Gradient, Divergence and Curl.

Module 2: Partial Differential Equations	No. of Hrs: 12

Solution of PDE's using Finite difference method: Classification of second order PDE, Solution of one dimensional Heat Equation using Schmidt method, One-Dimensional Wave Equation using explicit method, Solution of two-dimensional Laplace Equation.

Module 3: Multiple Integrals	No. of Hrs: 12

Multiple Integrals: Evaluation of Double and Triple integrals, Evaluation of Double integrals by change of order of integration and changing into polar coordinates. Applications to find Area, Volume, and Total mass by double integral.

Module 4: Probability	No. of Hrs: 10

Probability: Introduction, Algebra of Events, Addition theorem, Conditional probability, Multiplication law, Baye's Theorem.

Module 5: Probability Distribution	No. of Hrs: 10

Probability Distribution: Discrete and Continuous Random variable, Mathematical expectation, Mean and Variance. Binomial, Poisson and Normal distribution.

Course Outcomes: At the end of the course, the student will be able to:

CO1: Illustrate the knowledge of fundamental concepts of Multivariable calculus, Vector differentiation, Multiple Integral, Partial differential equations and Probability

CO2: Apply suitable techniques to solve given problems related to Multivariable calculus, Vector differentiation, Multiple Integral, and Partial differential equations based on the acquired knowledge

CO3: Use appropriate models to solve problems involving probability and probability distributions

CO4: Solve engineering problems related to Multivariable calculus, Vector differentiation, Multiple Integral, Partial differential equations, Probability and Probability distributions

TEXTBOOKS

1. N.P Bali and Manish Goyal. (2022). *A textbook of Engineering Mathematics* (10th ed.). Laxmi Publications
2. Oliver C. Ibe. (2005). *Fundamentals of Applied Probability and Random Process* (2nd ed.). Elsevier Academic Press.

REFERENCE BOOKS

1. James Stewart. (2012). *Calculus: Early Transcendentals* (7th ed.). Cengage Learning.
2. E. Kreyszig. (2018). *Advanced Engineering Mathematics (*10th ed.). John Wiley & Sons.
3. Dennis G Zill. (2022). *Advanced Engineering Mathematics (*7th ed.). Jones-Bartlett.
4. Sheldon Ross. (2023). *A First Course in Probability* (10th ed.). Pearson.

Web links:

1. **Multivariable calculus:** NPTEL
https://www.youtube.com/watch?v=0ph5PU3Fsdc&list=PLFW6lRTa1g8174RC1q88PCU7VszfJWfg9&index=1
2. **Vector Differentiation (MIT Open courseware)**
https://www.youtube.com/watch?v=PxCxlsl_YwY&list=PL4C4C8A7D06566F38&index=1
3. **Multiple integrals NPTEL**
https://www.youtube.com/watch?v=ksS_yOK1vtk&list=PLbRMhDVUMngfIrZCNOyPZwHUU1pP66vQW&index=1
4. **Probability and Probability Distribution**
https://www.youtube.com/watch?v=mrCrjeqJv6U&list=PLEAYkSg4uSQ2qu-goWslUkq2hiZYlEzFH&index=1

FUNDAMENTALS OF ELECTRONICS ENGINEERING			
Semester	I/II	CIE Marks	50
Course Code	23ESCC104	SEE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:2)	Exam Hrs	03
Total Hours	64	Credits	04

Course Learning Objectives:
This course is designed to

1. **Understand** the working principles of electronic devices like semiconductor diodes, Bipolar transistors, Op-amp and their applications.
2. **Emphasize** the need for and impact of the digital domain.
3. **Impart** skills to design electronic circuits for simple applications.

Module 1: Semiconductor Diodes and Applications	No. of Hrs: 14

Semiconductor diodes: PN junction diode, Characteristics and Parameters, Diode rectifiers-Half wave rectifier, Full wave rectifier, Zener diode as voltage regulators, Design of DC power Supply.

Laboratory Components

1. Familiarization with Basic Electronic components, Usage of Electronics Equipment and Introduction to EDA tool.
2. Design and demonstrate the DC power supply circuit.

Module 2: Bipolar Junction Transistors and Applications	No. of Hrs: 14

Bipolar Junction Transistors: BJT operation, BJT Voltages and Currents, BJT amplification, DC Load line and Bias Point, Base Bias, Voltage divider Bias.
Amplifiers and Oscillators: Introduction, Concept of feedback, Negative feedback, Types of amplifiers, Gain, Frequency response, Bandwidth, Phase shift. Positive feedback, Conditions for Oscillations, RC Phase shift Oscillator.

Laboratory Components

1. Realize the audio amplifier using BJT.
2. Design and demonstrate the operation of the RC phase shift oscillator.
3. Experiment to plot the DC load line for BJT using the EDA tool.

Module 3: Operational Amplifier and 555 Timer	No. of Hrs: 12

Operational Amplifier: Block diagram, Ideal Op-amp, Op-amp parameters, Inverting and Non-Inverting Op-amp circuits, Op-amp applications: Voltage follower, Adder, Subtractor, Integrator, Differentiator, Comparator, Schmitt trigger, Wein Bridge Oscillator. IC 555 Timer and Astable Oscillator using IC 555.

Laboratory Components

1. Demonstrate the application of a 555 Timer.
2. Design and demonstrate the applications of Op-amp using the EDA tool.

Module 4: Digital Electronics	No. of Hrs: 14

Number Systems: Introduction, Number systems, Data representation, Binary arithmetic (addition, subtraction using complement form).
Logic Gates & Boolean simplification: Boolean algebra, De-Morgan's theorems, Logic Gates, Universal gates.
Combinational Circuits: Half Adder, Full Adder, Multiplexer, Encoders, Decoders.
Sequential Circuits: Introduction to latches and flip flops.

Laboratory Components
Application-based design and implementation of digital circuits.

Module 5: Electronic Appliances and Applications	**No. of Hrs: 10**

Simple applications of Electronics-Introduction to cellular mobile, Mobile Handset, Digital Imaging-Camera System, Scanner-Barcode Scanner and decoder.

Laboratory Components

1. Design and demonstrate burglar alarm circuit.
2. Design and demonstrate water level indicator circuit.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Understand the fundamentals and operations of Semiconductor diode, Bipolar junction transistors, Op-amps and 555 timer IC.

CO2: Apply the knowledge in developing different circuit applications using diode, Bipolar junction transistors, Op-amps and 555 timer.

CO3: Design and Develop different analog and digital circuits for engineering applications.

TEXT BOOKS

1. David A Bell. (2008). *Electronic Devices and Circuits* (5th ed). Oxford University Press.
2. Ramakanth A Gayakwad. (2022). *Op-Amps and Linear Integrated Circuits* (4th ed). Pearson Education.
3. M. Morris Mano. (2008). *Digital Logic and Computer Design* (3rd ed) . PHI Learning.
4. Dhir A. (2004). *Digital Consumer Technology Handbook* (1st ed). Elsevier.
5. S. P. Bali. (2018). *Consumer Electronics*. (2018). Pearson Education.

REFERENCE BOOKS

1. Mike Tooley. (2015). *Electronic Circuits, Fundamentals & Application.* (4th ed). Elsevier.
2. D.P. Kothari, I.J. Nagarath. (2014). *Basic Electronics*. (1st ed). McGraw Hill
3. V K Mehta & Rohit Mehta. (2018). *Principles of Electronics.* (11th ed). Chand Publications.
4. Albert Malvino. (2021). *Electronic Principles.* (9th ed). McGraw Hill Publications.

Web links:

1 . Diode basics, Characteristics, Rectifiers: https://archive.nptel.ac.in/courses/108/105/108105188/
2. BJT operation: https://youtu.be/HfKd-Y2SBFA, https://youtu.be/aVN7D2xZBRE
3. BJT Biasing: https://youtu.be/xY4_mJk6QAk, https://youtu.be/ZBNowcZIuYU
4. Negative feedback amplifier: https://www.youtube.com/watch?v=m4sjTt7rhow&t=10s
5. Positive feedback & oscillator: https://youtu.be/xHNDrbB-iWY
6. Op-amp basics, parameters: https://www.youtube.com/watch?v=uHQmNWbtwHU
7. OP-AMP applications:
https://archive.nptel.ac.in/courses/122/106/122106025/, https://www.youtube.com/watch?v=nqk714QpRos&t=1s
https://www.youtube.com/watch?v=AOdlsNmJ8Xo, https://www.youtube.com/watch?v=GCOdy-YcwIc
https://www.youtube.com/watch?v=CPP29SU0cco, https://www.youtube.com/watch?v=XXbo159T25o
8. 555 Timer: https://www.youtube.com/watch?v=WFsPI8_ZKbc
9. Number systems https://www.youtube.com/watch?v=yLP0vFSbCLg&t=1362s
10. Boolean algebra, De-Morgan's theorems:
https://www.youtube.com/watch?v=vNxTOpgv2gs&t=542s
11. Logic Gates, Universal gates:
https://www.youtube.com/watch?v=KbDjYnevQPg&t=3s
12. Half Adder Full Adder:
https://www.youtube.com/watch?v=85XxQZqBNlg
13. Introduction Latches, flip flops:
https://www.youtube.com/watch?v=jm0PGDSSBkI
https://www.youtube.com/watch?v=i-tnQMDdbfc

ENGINEERING GRAPHICS			
Semester	I/II	CIE Marks	50
Course Code	23ESCC105	SEE Marks	50
Teaching Hours/Week (L:T:P)	2:0:2	Exam Hrs	3
Total Hours	50	Credits	3

Course Learning Objectives: This course is designed to

1. Impart basic principles and conventions of engineering drawing to use drawing as an effective communication mode and the use of orthographic projection methods to generate Engineering drawings of points, lines, planes and solids using Drafting software.
2. Impart drawing skills for the development of surfaces of solids.
3. Disseminate skills of drawing free hand sketches of the components by applying engineering drawing concepts.
4. Make an understanding of 3D modelling of engineering components using Drafting software and generate 2D orthographic views.

Module 1 : Projections of Points & Lines	**No. of Hrs: 10**

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales, Geometrical constructions & Dimensioning, and Orthographic projections. Introduction to Solid Edge software, Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.
Orthographic projection of Points and Lines in First Quadrant, Exercises on lines related to Real time scenario.

Module 2 : Projections of Plane Surfaces	**No. of Hrs: 10**

Orthographic projections of planes viz, triangle, square, rectangle, pentagon, hexagon, and circular lamina (Placed in First quadrant only, using change of position method).

Module 3 : Orthographic projection of Solids	**No. of Hrs: 12**

Orthographic projection of right regular solids Resting on Horizontal Plane; Prisms & Pyramids (triangle, square, pentagon, hexagon), Cylinders, Cones, Cubes, & Tetrahedron by change of position method.

Module 4 : Isometric Projections	**No. of Hrs: 10**

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres. Isometric projection of combination of two solids Conversion of isometric drawings into orthographic views.
Exercises on applications of Isometric projection of objects.

Module 5 : Development of Lateral Surfaces of Solids	**No. of Hrs: 8**

Development of lateral surfaces of right regular prisms, cylinders, pyramids, and cones resting with base on Horizontal Plane. Development of lateral surfaces of their frustums and truncations. Problems on applications of development of lateral surfaces of funnels and trays.

Assignments on Multidisciplinary Applications & Practice
Electric Wiring and lighting diagrams: Automatic fire alarm, Call bell system, UPS system, Electronics Engineering Drawings: Simple Electronics Circuit Drawings.
Graphs & Charts: Column chart, Pie chart, Line charts, and Gantt charts using any suitable software Introduction to 3D modeling: Making 3D models of simple objects and obtaining various 2D views.
Interpretation of Production Drawing through Geometric Dimensions & Tolerances and bill of materials.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Familiarize the use of basic knowledge of geometrical constructions, scales and dimensioning in the engineering drawing scenario; **illustrate** use of Solid Edge software drafting tools/commands to make 2-Dimensional engineering drawing.

CO2: Apply the Orthographic Projection principle to **sketch** the First angle projections (front view, top view and side view) of point, line, plane and solid.

CO3: Visualize and **draw** the 3-Dimensional view of combination of two solids.

CO4: Develop the lateral surfaces of solids to **sketch** the surface area pattern.

TEXT BOOKS

1. Bhatt, N.D.(2019). *Engineering Drawing: Plane and Solid Geometry* (53rd ed.). Charotar Publishing House Pvt. Limited.
2. K. R. Gopalakrishna, & Sudhir Gopalakrishna. (2017). *Textbook of Computer Aided Engineering Drawing* (39th ed.). Subash Stores, Bangalore.

REFERENCE BOOKS

1. Venugopal K. (2014) *Engineering Drawing and Graphics*. (1st ed.). New Age International publishers.
2. Bhattacharya S. K. reprint 2005(1998). *Electrical Engineering Drawing* (2nd ed.). Publisher. New Age International publishers.
3. Chris Schroder. (1997). *Printed Circuit Board Design using AutoCAD* (1st ed.). Newnes.

Web links:

1. Introduction to Engineering Drawing -https://nptel.ac.in/courses/112103019
2. Engineering Graphics & Design -https://onlinecourses.nptel.ac.in/noc21_me128/preview

FUNDAMENTALS OF AI & CYBER SECURITY			
Semester	I/II	CIE Marks	50
Course Code	23ESCC106	SEE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	Exam Hrs	03
Total Hours	42	Credits	03

Course Learning Objectives: This course intends

1. To provide an insight about basic concepts of Artificial Intelligence and workflow of Intelligent Agents.
2. To impart knowledge of machine learning and its applications.
3. To familiarize Cyber Crimes and Security mechanisms.

Module 1 : Overview of Artificial Intelligence	**No. of Hrs: 08**

Introduction to AI, Automating Intelligence, Man Vs Computer, Cognitive Science to Computer Modeling, Application Areas of AI, Comparison of Conventional and AI Computing, Intelligent Agents.

Module 2 : Problem Solving using AI Agent	**No. of Hrs: 09**

Problem Solving by intelligent agents; Problem Formulation, State Space Representation, Search Problems: Playing Chess, 8-Puzzle,Water Jug Problem, Problem Reduction, Production Systems, 8-Puzzle Production System.

Module 3 : Introduction to Machine Learning	**No. of Hrs: 08**

Introduction to Human Learning, Types of Human Learning, Machine Learning, Types of Machine Learning, Non-Machine Learning Problems, Applications of Machine Learning: Banking & Finance, Insurance, and Healthcare. Case Study : Decision Tree.

Module 4 : Introduction to Cyberspace and Cyber Crime	**No. of Hrs: 09**

Defining Cyberspace, Overview of Internet and World Wide Web, Introduction to Cyber-Crime, Cyber-crime Classification: Phishing, Email Spoofing, Credit card fraud, Password cracking, Cyber-stalking, Social Engineering, Virus and Trojan Horse.

Module 5 : Introduction to Cyber Security	**No. of Hrs: 08**

Cyber security: Need and Importance, CIA Triad, Types of security: Application security, Endpoint security, Mobile security, Data security, Authentication: Authentication factors, Two factor authentications, Multi-factor authentication, Firewall: hardware and software firewalls.

Course Outcomes: Student will be able to:

CO1. Understand the workflow of agents in Artificial Intelligence and design intelligent agent for problem solving.

CO2. Illustrate the concepts of Machine Learning, Applications and its advantages over human learning.

CO3. Analyze the cybercrimes on digital platform and articulate defense mechanism for cyber attacks.

TEXT BOOKS

1. Dr. Munesh Chandra Triveni, (Reprint 2019), "A Classical Approach to Artificial Intelligence", (2nd Edition), Khanna Book Publishing. **(Chapter 1: 1.1, 1,2, 1.3, 1.4, 1.5, 1.6, Chapter 2: 2.1, 2.2, 2.3, 2.4:2.4.1, 2.4.2, 2.4.4, 2.5, 2.6, 2.7)**

2. Dr.Nilakshi Jain(2019), "Artificial Intelligence: Making a System Intelligent", (1st Edition), Wiley Publisher. **(Chapter 2: 2.1 to 2.7)**
3. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, (2018), "Machine Learning", (1st Edition), Pearson. **(Chapter 1.1, , Chapter 7 : 7.5.2, 7.5.2.1, 7.5.2.2, 7.5.2.3, 7.5.2.4, 7.5.2.5)**
4. Sunit Belapure and Nina Godbole, (Reprint 2022), "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", (1st Edition), Wiley India Pvt. Ltd. **(Chapter 1 : 1.5, Chapter 2: 2.3, 2.4, Chapter 4: 4.3, 4.4, 4.6, 4.7)**
5. Anand Shinde, (2021), " Introduction to Cyber Security Guide to the World of Cyber Security", notion press, **(Chapter 1: 1.1, Chapter 2: 2.1, 2.2, Chapter 3: 3.4, 3.5, 3.7, 3.8, Chapter 4: 4.2, 4.4.3)**

REFERENCE BOOKS

1. Stuart Russell and Peter Norvig, (2010), "Artificial Intelligence: A Modern Approach", (3rd Edition) ,Pearson.
2. Robert M Slade, (2005), "Software Forensics", Tata McGraw Hill.

Online Web links:

1. AI Fundamentals: https://www.aima.cs.berkeley.edu
2. Cybercrime Basics: https://www.youtube.com/watch?v=qS4ViqnjkC8
3. ITA 2000: https://www.youtube.com/watch?v=czDzUP1HclQ
4. How criminals plan attacks: https://youtu.be/z2ilqLn_qjc
5. DDOS Attack: https://youtu.be/PTJ6UZz1pPQ
6. Keyloggers: https://youtu.be/6NdPeYCwEFE

FUNDAMENTALS OF CIVIL ENGINEERING & ENGINEERING MECHANICS			
Semester	I/II	CIE Marks	50
Course Code	23ESCC107	SEE Marks	50
Teaching Hours/Week (L:T:P)	(2:0:0)	Exam Hrs	02
Total Hours	26	Credits	02

Course Learning Objectives:

This Course is designed:

1. To impart the basic Knowledge on Building Materials and Components of Buildings.
2. To develop student's ability to analyze the current trends in Infrastructural Engineering.
3. To enable students to learn various systems of forces.
4. To develop student's ability to determine the Centroid, Moment of Inertia and their applications.

Module 1: Civil Engineering & its Significance	No. of Hrs: 05

Overview of Civil Engineering: Brief history of Civil Engineering, Relevance of Civil Engineering in the Infrastructural Development of Nation.

Building materials and their significance: Cement, Stones, Bricks, Aggregates, Steel, Concrete and Smart materials.

Structural Elements of a Building: Foundation, Plinth, Lintel, Sunshade, Masonry Wall, Column, Beam, Slab (Definition with simple sketches). Floor area ratio calculations and significance for a residential building.

Module 2:Current Trends in Infrastructure Engineering	No. of Hrs: 05

Concepts and Components: Smart City, Energy Efficient Building and Structural Health Monitoring.

Building Information Modeling: Introduction, Components and Applications.

Module 3: Analysis of Coplanar Concurrent Force system	No. of Hrs: 05

Force and Force system: Introduction to Engineering Mechanics, Force, Force system, Principle of transmissibility of a force, Principle of superposition of forces, Principle of Physical independence of force, Resolution of a force, Composition of forces, Free body diagrams and Moment of a force.

Coplanar Concurrent force system: Resultant of coplanar concurrent force system. Numerical Problems on Coplanar Concurrent force system.

Module 4: Centroid of Plane Figures	No. of Hrs: 05

Introduction and Applications of Centroid and Centre of gravity. Derivation of Centroid of Rectangle, Triangle, Semicircle and Quarter circle using method of integration including numerical problems on Centroid of composite figures (1st Quadrant and without any deductable areas).

Module 5: Moment of Inertia of Plane figures	No. of Hrs: 06

Introduction to Inertia and Moment of Inertia, Applications, Parallel axes theorem, Perpendicular axes theorem. Derivation of Moment of inertia of rectangular and triangular areas by the method of integration. Numerical problems on Moment of Inertia of T, I and symmetrical Channel Section.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Relate the knowledge in identifying basic construction materials and components of Buildings.

CO2: Make use of the knowledge of recent technologies in infrastructural development.

CO3: Analyze force system to determine resultant force under various situations.

CO4: Apply concept of Centroid and Moment of Inertia to real-time situations.

TEXT BOOKS

1. Ganesh B. Mogaveer and M.N. Sheshaprakash (2015). Elements of Civil Engineering and Engineering Mechanics (3rd ed.). PHI learning Private Limited.
2. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan (2015). Basic Civil Engineering and Engineering Mechanics (3rd ed.). Laxmi Publications.
3. Irving H. Shames (2015). Engineering Mechanics. (4th ed.). Prentice-Hall.

REFERENCE BOOKS

1. Ferdinand Beer and Johnston (2019). Vector Mechanics for Engineers (12th ed.). McGraw-Hill Education.
2. M Anji Reddy (2019). Engineering Mechanics. New Age International.
3. Reddy Vijaykumar K and Suresh Kumar K(2011). Engineering Mechanics (3rd ed.). BS publications.

Web links:

1. Introduction to Civil engineering: https://www.youtube.com/watch?v=Jy06m2IozZ8
2. Components of Building: https://www.youtube.com/watch?v=Qftr8EeiiMs
3. Smart City: https://www.youtube.com/watch?v=bANfnYDTzxE
4. Zero Energy Building: https://www.youtube.com/watch?v=FysJKq5yCfg
5. Structural Health Monitoring: https://www.youtube.com/watch?v=UbmToxTl7gs
6. BIM: https://www.youtube.com/watch?v=0J0d-LjInEU
7. Co planar concurrent Force system: https://www.youtube.com/watch?v=6u_rjLjv-MY
8. Centroid: https://www.youtube.com/watch?v=qGQHiRVDtQI
9. Centroid and center of gravity: https://www.youtube.com/watch?v=umXye72SkMY
10. Moment of Inertia: https://www.youtube.com/watch?v=ZwuwzE1qAi4
11. Moment of Inertia: https://www.youtube.com/watch?v=Bls5KnQOWkY

ಬಳಕೆ ಕನ್ನಡ (Balake Kannada)			
Semester	I/II	CIE Marks	50
Course Code	23HMCC108	SEE Marks	50
Teaching Hours/Week (L:T:P)	1:0:0	Exam Hrs	02
Total Hours	13	Credits	01

Course Learning Objectives:

1. To create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Module 1	**No. of Hrs: 2**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conversation, Listening and Speaking Activities, Key to Transcription.
3. **ವೈಯಕಿಕ್ತ, ಸಾಮ್ಯಸೂಚಕ / ಸಂಭಂದಿತ ಸರ್ವನಾಮಗಳು ಮತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು**-Personal Pronouns, Possessive Forms, Interrogative words.

Module 2	**No. of Hrs: 2**

1. ನಾಮ ಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸದ್ಧ ಪಶ್ನೆಗಳು ಮತು ಸಂಬಂಧ ವಾಚಕ ನಾಮಪದಗಳು-Possessive forms of nouns, dubitive question and Relative nouns.
2. ಗುಣ, ಪರಿಮಾಣ ಮತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು ಸಂಖ್ಯಾವಾಚಕಗಳು - Qualitative, Quantitative and Colour Adjectives, Numerals.
3. ಕಾರಕ ರೂಪಗಳು ಮತು ವಿಭಕಿ ಪ್ರತ್ಯಯಗಳು- ಸಪ್ತಮಿ ವಿಭಕಿಪ್ರತ್ಯಯ – (ಆ,ಅದು,ಅವು,ಅಲಿ)- Predictive Forms, Locative Case.

Module 3	**No. of Hrs: 3**

1. ಚತುರ್ಥಿ ವಿಭಕಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತು ಸಂಖ್ಯಾವಾಚಕಗಳು - Dative Cases, and Numerals.
2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತು ಬಹುವಚನ ನಾಮರೂಪಗಳು - Ordinal numerals and Plural markers.
3. ನೂನ್ಯ/ನಿಷೇಧಾರ್ಥಕ ಕಿಯಾಪದಗಳು & ವರ್ಣಗುಣವಾಚಕಗಳು - Defective/Negative Verbs & Colour Adjectives.

Module 4	**No. of Hrs: 3**

1. **ಅಪಣ್ಣೆ/ಒಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತಾಹ ಮತು ಒತಾಯ ಅರ್ಥರೂಪ ಪದಗಳು ಮತು ವಾಕ್ಯಗಳು**-Permission, Commands, encouraging and Urging words (Imperative words and sentences).
2. **ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲಿ ದ್ವಿತೀಯ ವಿಭಕಿಪ್ರತ್ಯಯಗಳು ಮತು ಸಂಭವನೀಯ ಪಕ್ರಾರಗಳು** - Accusative Cases and Potential Forms used in General Communication.
3. **"ಇರುಮತುಇರಲ" ಸಹಾಯಕ ಕಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯ ಸೂಚಕ ಮತು ನಿಷೇಧಾರ್ಥಕ ಕಿಯಾಪದಗಳು**-Helping Verbs "iru and iralla", Corresponding Future and

Negation Verbs.

4. **ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧಸೂಚಕ, ವಸುಸ್ತೂಚಕ ಪತ್ರಖಯಗಳು ಮತು ್ತ ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ**-Comparitive, Relationship, Identification and Negation Words.

Module 5	No. of Hrs: 3

1. **ಕಾಲ ಮತು ್ತಸಮಯದ ಹಾಗು ಕಿಖಯಾಪದಗಳ ವಿವಿಧಪಕ್ರಾರಗಳು** - Different types of Tense, Time and Verbs.
2. **ದ್,ತ್,ತು,ಇತು,ಆಗಿ,ಅಲ್ಲಗ್,ಕ್,ಇಧೆ,ಕಿಖಯಾ ಪತ್ರಖಯಗಳೊಂಧಿಗೆ ಭೂತ, ಭವಿಷತ್ತು, ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯರಚನೆ** -Formation of Past, Future and Present Tense Sentences with Verb Forms.
3. Kannada Vocabulary List – **ಸಂಭಾಷಣೆಯಲಿ ್ಲದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು** - Kannada Words in Conversation

Course Outcomes:

At the end of the course, the student will be able to:

CO1: To understand the necessity of learning of local language for comfortable life**.**
CO2: To speak, read and write Kannada language as per requirement.
CO3: To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4: To Listen and understand the Kannada language properly.
CO5: To speak in polite conservation.

TEXT BOOK

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ. ಬಳಕೆ ಕನ್ನಡ, ಪಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯತಾಂತಿಕ ವಿಶ್ವವಿದಾಳಯ, ಬೆಳಗಾವಿ

Online Web links

MODULE 1: https://www.youtube.com/watch?v=Ia3gRph2seI
MODULE 2: https://www.youtube.com/watch?v=mhjpnb5QgPc
MODULE 3: https://www.youtube.com/watch?v=QxSa2UetE-U
MODULE 4: https://www.youtube.com/watch?v=lkIlpQAWCs4
MODULE 5: https://www.youtube.com/watch?v=5LMk4GBN4as

ಸೂಚನೆ : ಹೊರ ರಾಜ್ಯ / ವಿದೇಶಿ / ಕನ್ನಡ ಭಾಷೆಯನು ್ನಹತನ್ತೇ ತರಗತಿಯಲಿ ್ಲಒಂದು ಭಾಷೆಯನಾಗಿ ಅಧಖಯನ ಮಾಡಿಲಲ್ಲ ವಿಧಾರ್ಥಿಗಳು ಬಳಕೆ ಕನ್ನಡ ವಿಷಯವನು ್ನಕಡಾಖಯವಾಗಿ ಕಲಿಯತಕ್ಕದು ್ದ

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ			
Semester	I/II	CIE Marks	50
Course Code	23HMCC109	SEE Marks	50
Teaching Hours/Week (L: T:P)	1:0:0	Exam Hrs	02
Total Hours	13	Credits	01

Course Learning Objectives: ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು

1.ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ ಸಾಹಿತ್ಯಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2.ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
3.ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗು ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4.ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗು ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5.ಸಾಂಸ್ಕೃತಿಕ, ಜಾನಪದ ಹಾಗು ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿ ಕೊಡುವುದು.

Module 1:ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು	**No. of Hrs: 3**
ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ – ಹಂಪನಾಗರಾಜಯ್ಯ ಕರ್ನಾಟಕ ಏಕೀಕರಣ: ಒಂದು ಅಪೂರ್ವಚರಿತ್ರೆ-ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ – ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ.ವಿ. ಕೇಶವಮೂರ್ತಿ	

Module 2:ಆಧುನಿಕ ಪೂರ್ವದ ಪದ್ಯಭಾಗ	**No. of Hrs: 2**
ವಚನಗಳು: ಬಸವಣ್ಣ ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿಲಕ್ಕಮ್ಮ ಆಯ್ದಕ್ಕಿಮಾರಯ್ಯ ಜೇಡರದಾಸಿಮಯ್ಯ ಕೀರ್ತನೆಗಳು: ಅದರಿಂದೇನೂಫಲ ಇದರಿಂದೇನುಫಲ -ಪುರಂದರದಾಸರು ತಲಣ್ಣಿಸದಿರು ಕಂಡ್ಯತಾಳು ಮನವೇ -ಕನಕದಾಸರು ತತ್ಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳಸುಟ್ಟುಶಿಶುನಾಳಶರೀಫ	

Module 3: ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ	**No. of Hrs: 2**
ಡಿವಿಜಿರವರ ಮಂಕುತಿ ಮಾವಕಗ್ಗದಿಂದ ಆಯ್ದಕೆಲವು ಭಾಗಗಳು ಕುರುಡು ಕಾಂಚಾಣ : ದ.ರಾ.ಬೇಂದ್ರೆ ಹೊಸ ಬಾಳಿನಗೀತೆ : ಕುವೆಂಪು	

Module 4: ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ	**No. of Hrs: 3**
ಡಾ. ಸರ್ . ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ ವ್ಯಕ್ತಿತ್ವಮತ್ತು ಖಗತಿಹ್ಯ- ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್ ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ	

Module 5:ಸಾಂಸ್ಕೃತಿಕ ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ	**No. of Hrs: 3**
ಯುಗಾದಿ: ವಸುದೇಂದ್ರ ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ	

Course Outcomes:

At the end of the course, the student will be able to:

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (23HMCC109) ಪಠ್ಯಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ:

CO1: ಕನ್ನಡ ಭಾಷೆ ಸಾಹಿತ್ಯಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2: ಕನ್ನಡ ಸಾಹಿತ್ಯ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜಾಗೃತಿಗೆ ಸೂಕ್ತಿ ಮೂಡುತ್ತದೆ.
CO3: ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗು ಆಸಕ್ತಿ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4: ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗು ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದು ಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5: ಸಾಂಸ್ಕೃತಿಕ, ಜಾನಪದ ಹಾಗು ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡಲಾಗುವುದು.

TEXT BOOKS
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ, ಡಾ. ಹಿ ಚಿ ಬೋರಲಿಂಗಯ್ಯಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ, ಪ್ರಕಟಣೆ: ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ
ಸೂಚನೆ : ಹತ್ತನೇ ತರಗತಿಯಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಒಂದು ಭಾಷೆಯನಾಗಿ ಅಧ್ಯಯನ ಮಾಡಿರುತಾರ್ತೋ ಅಂತಹ ವಿದ್ಯಾರ್ಥಿಗಳು ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ವಿಷಯವನ್ನು ಕಡ್ಡಾಯವಾಗಿ ಕಲಿಯತಕ್ಕದ್ದು.

ENGINEERING CHEMISTRY			
Semester	I/II	CIE Marks	50
Course Code	23BSCC110	SEE Marks	50
Teaching Hours/Week (L:T:P)	(2:0:2)	Exam Hrs	03
Total Hours	50	Credits	03

Course Learning Objectives:

This course is designed to

1. Introduce the fundamental knowledge of fuels, green fuels, renewable energy and energy storage systems with a focus on solar energy, solar cells, battery technology and fuel cells along with their applications.
2. Impact essential chemical techniques of water purification and e-waste management to resolve global human health and environmental issues.
3. Strengthen the comprehensive knowledge of analytical techniques, corrosion, organic and inorganic materials and their applications in organic electronics.
4. Develop higher order learning skills through integration of relevant experimental studies.

Module 1 : Battery Technology and Fuel Cells	**No. of Hrs: 10**

Battery Technology: Introduction to Galvanic cell and Concentration cell. Classification of batteries. Principle, construction, working and applications of solid state battery (Li-polymer battery) and Sodium-ion Batteries.

Fuel Cells: Introduction, difference between conventional battery and fuel cell. Advantages & limitations of fuel cells. Types of fuel cells. Principle, construction, working and applications of Proton membrane exchange fuel cells.

Lab component:

1. Determination of EMF of the electrochemical cell by varying the concentration of the electrolyte.
2. Determination of strength of an acid in Pb-acid battery.

Module 2: Water Technology and E- Waste Management	**No. of Hrs: 10**

Water Technology: Introduction, Potable water- specifications as per WHO standards.

Water purification: Membrane filtration-Reverse osmosis and cellulose based water filters. Membrane Separation-Electrodialysis. Drinking water treatment-UV treatment. Graphene membranes for water filtration. Softening of water by ion exchange method.

E-Waste Management: Introduction, sources of E-waste, Toxic materials used in manufacturing electronic and electrical products. Methods of disposal. Extraction of copper from E-waste. Role of stake holders in environmental management of E-waste (producers, consumers, recyclers, and statutory bodies).

Lab component:

1. Determination of turbidity in the given sewage water sample.
2. Determination of Copper in E-waste by spectrochemical method.

Module 3: Organic Electronics and Analytical Techniques	**No. of Hrs: 10**

Organic Electronics: Introduction, Materials for organic electronics-Liquid Crystals-classification, properties and applications. Organic Semiconductors-Introduction, principle, working, properties and applications of Organic Light Emitting Diode (OLED).

Sensors: Introduction, principle, working and applications of Electrochemical sensors.

Analytical Techniques: Introduction, Electrochemical methods of analysis-Conductometry, Potentiometry. Spectrochemical method-Colorimetry.

Lab component:

1. Quantitative estimation of iron by Potentiometric method of analysis and graphical representation using Excel.
2. Evaluation of acid content in beverages by Conductometric method.

Module 4 : Fuels and Renewable Energy	**No. of Hrs: 10**

Fuels: Introduction, definitions of calorific value, lower calorific value, and higher calorificvalue-numerical. Knocking mechanism and octane number, anti-knock additives and biodiesel.

Solar Energy: Introduction, Photovoltaic cells- principle, construction, working and applications of Photovoltaic cell and Perovskite solar cell. Advantages and disadvantages of PV cells.

Green fuel: Introduction, Hydrogen-production (photo catalytic water splitting) and applications, Compressed Natural Gas (CNG), Synthetic Natural Gas (SNG).

Lab component:

1. Synthesis of biodiesel.
2. Determine the molecular weight of polymer by viscometric method.

Module 5: Corrosion and New Engineering Materials	**No. of Hrs: 10**

Corrosion: Introduction, methods of corrosion, Types of corrosion: Differential metal, differential aeration. Corrosion control-Design and selection of materials, Numerical on corrosion penetration rate.

Polymers: Introduction, Polymer composites-synthesis, properties and applications of Kevlar Fibre.

Biodegradable and biocompatible polymers. Conducting polymers: Introduction, Synthesis, properties and applications of polyacetylene.

Nanomaterials: Introduction, synthesis of nanomaterials by precipitation method. Introduction, properties and engineering applications of Graphene.

Ceramics: Introduction, classification based on chemical composition, properties and applications of perovskites ($CaTiO_3$).

Lab component:

1. Synthesis of iron oxide nanoparticles.
2. Chemical Structure drawing of polymers using Chem Draw software.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Illustrate the knowledge on fundamentals of fuels, alternative fuels, renewable energy sources, energy storage & conversion devices, organic electronics, analytical methods, new engineering materials andcorrosion.

CO2: Utilize the knowledge of various techniques for water purification, e -waste disposal and also chemical methods of corrosion control.

CO3: working principles of energy storage and conversion devices and solve numerical problems related to calorific value and corrosion penetration rate.

CO5: Demonstrate the experiments related to synthesis of engineering materials, alternative fuels, techniques of water purification, e-waste disposal, interpret the results of the quantitative analysis using modern tools and present reports in prescribed format.

TEXT BOOKS

1. B. R. Puri, L. R. Sharma & M. S. Pathania. (2019). *Principles of Physical Chemistry* (48th ed.). VishalPublishing Company.
2. R.V. Gadag and Nitthyananda Shetty. (2019). *A Text Book of Engineering Chemistry* (1st ed.).MEDTECH A division of Scientific International Pvt. Ltd.
3. Dr. Hari Krishna S, Dr. Sunitha Rani N, Dr, Shailashree S. (2022). *Engineering Chemistry* (1st ed.).Book Rivers Publishers.

REFERENCE BOOKS

1. Kirby W. Beard. (2019). *Linden's Handbook of Batteries* (5th ed.). Mc Graw Hill.
2. Douglas A. Skoog, F. James Holler, Stanley R. Crouch (2020). *Principles of Instrumental Analysis* (7th ed.). Cengage Learning.
3. Peter J. Collings. (2019). *Introduction to Liquid Crystals* (5th ed.). CRC Press.
4. John Armstrong. (2021). *The future of energy.* Energy Technology Publishing.
5. Malini S, KS Anantha Raju. (2022). *Chemistry of Engineering Materials* (1st ed.). CBS Publishers & Distributors Pvt. Ltd.

Web links:

1. Super Capacitors-Analysis, Comparison and applications, https://youtu.be/LLnzofLTveE
2. Synthesis of Graphene Membrane, https://www.youtube.com/watch?v=VqYcBpFXZvc
3. OLED display principle, fabrication, https://www.youtube.com/watch?v=xAMhX3Drq14
4. Construction of pervoskite solar cells, https://youtu.be/crAugJXG3QA
5. Kevlar and its societal applications, https://www.youtube.com/watch?v=BGWJGX5skV8

COMPUTATIONAL THINKING & PROGRAMMING			
Semester	I/II	CIE Marks	50
Course Code	23ESCC111	SEE Marks	50
Teaching Hours/Week (L:T:P)	3:0:2	Exam Hrs	3
Total Hours	64	Credits	4

Course Learning Objectives:

This course

1. Develops the ability to analyze a problem, develop an algorithm to solve it and understand the digital computer functional units.
2. Provides exposure to students on constructs of the C programming language such as data types, decision making statements and looping statements to solve a given problem.
3. Provides exposure to students on concept of Arrays, Strings, Structures, Unions and Files for data storage in problem solving.
4. Provides exposure on modular programs using Functions and Pointers for a given problem.
5. Enable students to choose a suitable C-construct to develop C code for a given problem.

Module 1 : Computational Thinking	No. of Hrs: 14

Introduction to Problem solving: What is Computational Thinking, key techniques of computational thinking- problem analysis, logic building for solutions, Algorithm, Pseudo Code & Flow Chart, Debugging & testing the codes.

Introduction to Digital computers: Parts of a computer – Overview of operating systems, assemblers, compilers, interpreters and programming languages.

Module 2:C Programming Constructs	No. of Hrs: 14

Introduction to C: Basic structure of a C program and execution process. Pre-processor directives, Constants and Variables. Operators, Primitive data types, Type casting, I/O statements, and format specifications. **Control statements – decision making and Loop control structure:** *if, if-else, nested if-else, else-if ladder and switch* statements. *While loop, for loop, do-while loop* and nested loop. **Unconditional control transfer statements**: *break, continue, exit and return* statements.

Laboratory Component

1. Programming exercises using simple if and if else
2. Programming exercises using else if ladder
3. Programming exercises using switch statements
4. Programming exercises using Loops

Module 3:Arrays and Strings	No. of Hrs: 12

Array handling in C – declaration – single dimensional arrays, two – dimensional arrays, sorting and searching on single dimensional arrays. String handling functions and manipulation on strings.

Laboratory Component

1. Programming exercises using 1-D Array
2. Programming exercises using 2-D Array
3. Programming exercises using Strings

Module 4:Functions and Pointers	**No. of Hrs: 12**

Pointers: Definition, Initialization, Pointers arithmetic, Pointers & Arrays and Dynamic memory allocation. **Functions:** Prototype declaration, function definition, function call, arguments (formal and actual) to functions and return types. Types of functions, difference between built-in and user-defined functions.

Laboratory Component

1. Programming exercises using pointers
2. Programming exercises using dynamic memory allocation
3. Programming exercises using functions

Module 5:Structure and Files	**No. of Hrs: 12**

Structure: Structure declaration, initialization, accessing structure members (using structure variable and pointer). Union, difference between structure and union. Introduction to files and operations.

Laboratory Component

1. Programming exercises using structures
2. Programming exercises using file handling.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Develop logic and write algorithm/pseudo code/ flowchart for a given problem.

CO2: Apply the programming constructs like decision making statements and loops to solve given problems.

CO3: Apply the concept of strings and arrays in programming to solve given problems.

CO4: Design and develop solutions to given problems using modular programming and pointers.

CO5: Apply the concepts of structures and files to solve given problems.

TEXT BOOKS

1. Kernighan and Ritchie, (1988) "*The C Programming Language*", (2nd ed.) Prentice Hall. (Chapter 2.1 to 2.12 , 3.1 to 3.8)
2. M. Sprankle (2012) "*Problem solving & Programming concepts*", (9th ed). Pearson Education (Chapter 1, chapter 2:Constants and Variables)
3. Reema Thareja,(2016) "*Computer Fundamentals and Programming in C*", (2nd ed), Oxford Higher Education.(Chapter 1.1 to 1.2, 1.6 to 1.9, Chapter 2.1 to 2.2, Chapter 3.1 to 3.7, 3.10, Chapter 6.1 to 6.2, 6.11 Chapter 8.4 to 8.6, Chapter 9.2 to 9.11, Chapter 11.1 to 11.8, Chapter 12.1 to 12.4, 12.5.5, 12.7 to 12.8, Chapter 13.1, 13.3 to 13.4.7, 13.5 to 13.5.2, 13.6, Chapter 14.1 to 14.9, 14.18 to 14.20, Chapter 15.1 to 15.9,Chapter 16.1 to 16.5, 16.7.)

REFERENCE BOOKS

1. R. G. Dromey, (1982) "*How to Solve It By Computer*", Pearson.
2. Byron S. Gottfried, "*Program with C*", Second Edition, Schaums Outline series.
3. YashavantKanetkar,(2002). "*Let us C*", BPB Publications.
4. Yashavant Kanetkar, *Understanding pointers*, BPB Publications.

Online Web links:

1) Computational thinking https://www.youtube.com/watch?v=qbnTZCj0ugI
2) Computational thinking https://www.youtube.com/watch?v=dHWmnayy8MY
3) Complete C https://www.youtube.com/watch?v=7MYx4Fx_eXI
4) Complete C https://archive.nptel.ac.in/courses/106/104/106104128/

FUNDAMENTALS OF ELECTRICAL ENGINEERING			
Semester	I/II	CIE Marks	50
Course Code	23ESCC112	SEE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	Exam Hrs	03
Total Hours	42	Credits	03

Course Learning Objectives:

This course is designed to

1. Provide an overview to **understand** the principles of electrical power generation, transmission, and distribution.
2. Impart the skills to **analyze** AC and DC circuits.
3. Familiarize the **applications** of electrical machines.

Module 1: Electrical Power Generation, Transmission and Distribution	No. of Hrs: 09

Electrical Power Generation, Transmission and Distribution: General structure of electrical power system using single line diagram approach, Electric power generation, Concept of power transmission and power distribution with single line diagram.

Domestic Wiring & Safety Measures: Brief discussion on Service mains, Meter board, Distribution board; Types of wiring, Elementary discussion on Circuit protective devices: Fuses and Circuit Breaker; Electric shock, Precautions against shock. Earthing: Pipe and Plate earthing.

Electricity Billing & Need for Energy Saving: Measuring the electricity consumption, Two-part electricity tariff, Block rate tariff, Calculation of energy consumption for given set of loads, Calculation of electricity bill for domestic consumers.

Module 2: DC Circuits and Single-phase AC Circuits	No. of Hrs: 09

DC Circuits: Ohms Law, Voltage division & Current division in DC circuits; Analysis of series, Parallel and series-parallel circuits excited by independent voltage sources; Power and Energy; Kirchhoff's Laws.

Single-phase AC Circuits: Generation of sinusoidal voltage, Frequency of generated voltage, Average value, R.M.S value, Form factor and Peak factor; Voltage, current and power analysis of basic R, L, C, RL, RC and RLC circuits with phasor Diagrams. Concept of Real power, Reactive power, Apparent power, and Power factor.

Module 3: Three-phase AC Circuits and Single-phase transformer	No. of Hrs: 07

Three-phase AC Circuits: Generation of three-phase voltage; Representation of balanced star and delta system (for both source and load); the relation between phase and line values of voltage and current.

Single-phase Transformer: Working principle, Types of Transformer, Transformation ratio, EMF Equation.

Module 4: Electrical Machines	No. of Hrs: 09

Electrical Machines: Generator & Motor

Generator: Principle of operation, Constructional details, Types of generators and Applications.

Motor: Principle of operation, Types of motors, Characteristics and Applications.

Module 5: Applications of Electrical Engineering	**No. of Hrs: 08**

Applications of Electrical Engineering: Electrical Appliances**,** Electric Locomotives, Smart Grid, Micro Grid, Vehicle to Grid (V2G) Technology, Case study on electrical wiring and estimation for a single storey building.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Estimate the power consumption of various domestic appliances.
CO2: Use the safety measures while handling electrical appliances.
CO3: Analyze DC & AC circuits.
CO4: Understand the use of electrical machines in day-to-day applications.

TEXT BOOKS

1. Hughes, John Hiley, Keith Brown, Ian McKenzie Smith. (2012). *Electrical & Electronics Technology* (10th ed.), Pearson.
2. D. C. Kulshreshtha. (2019). *Basic Electrical Engineering* (2nd ed.), Mc Graw Hill.
3. James Larminie, John Lowry, A John. (2012). *Electrical Vehicle Technology Explained* (2nd ed.) Wiley & Sons, Ltd. Publications.
4. S. C. Bhargava. (2020). *Household Electricity and Appliances* (1st ed.) BS Publications.

REFERENCE BOOKS

1. A. Mittle and V. N. Mittle. (2017). *Basic Electrical Engineering* (2nd ed.). Tata McGraw Hill.
2. V.K Mehta, Rohit Mehta. (2019). *Principles of Electrical Engineering and Electronics* (Revised ed.). S Chand and Company.
3. P.V. Prasad. (2019). *Basic Electrical Engineering* (Revised ed.). Cengage.
4. Vincent Del Toro. (2015). *Electrical Engineering Fundamentals* (2nd ed.). Pearson.
5. Dr. Debashisha Jena. (2012). *Basic Electrical Engineering* (1st ed.) Wiley India Private Limited.
6. Janaka Ekanayake, N. Jenkins, K. Liyanage, J. Wu, Akihiko Yokoyama. (2004). *Smart Grid: Technology and Applications*" Wiley.

Web links:

1. Power Generation: Hydro Power Plant: https://www.youtube.com/watch?v=OC8Lbyeyh-E
2. Power Transmission & Distribution: https://www.youtube.com/watch?v=cQ3-Kdx0kB0
3. Precautions against electric shock: https://www.youtube.com/watch?v=iNpizBLXao8
4. Generation of sinusoidal voltage animation: https://www.youtube.com/watch?v=JQ8h50 HpbsY
5. Generation of three phase voltage animation: https://www.youtube.com/watch?v=tFa DfOap2fs
6. Working principle of single-phase transformer: https://www.youtube.com/watch?v=xuI ADO0LJfM
7. Working principle of AC Machines: https://www.youtube.com/watch?v=gQyamjPrw-U
8. Electric Locomotives: https://www.youtube.com/watch?v=GJbUI2D3rLY
9. Vehicle to Grid Technology: https://www.youtube.com/watch?v=wHNFYMPFUv4

FUNDAMENTALS OF MECHANICAL ENGINEERING			
Semester	I/II	CIE Marks	50
Course Code	23ESCC113	SEE Marks	50
Teaching Hours/Week (L:T:P)	2:0:0	Exam Hrs	2
Total Hours	26	Credits	2

Course Learning Objectives:

This course is designed to

1. Comprehend basics of the conventional manufacturing process.
2. Disseminate the principles of advanced manufacturing concepts.
3. Familiarize fundamentals of gear drives and belt drives in power transmission applications.
4. Make a thorough understanding of thermal energy storage & its management and working principles of steam and gas power plants.
5. Impart fundamentals of Internal Combustion Engines and Electric Vehicles.

Module 1: Conventional Manufacturing	No. of Hrs: 05

Overview of Mechanical Engineering: Role of Mechanical Engineering in Industries and Society, Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Conventional Manufacturing Processes:

Machining: Working principle of Lathe, Lathe operation- turning, facing, thread cutting, knurling **Working principle of Drilling machine**, tapping, reaming, boring

Working principle of horizontal Milling machine.

Module 2: Advanced & Digital Manufacturing	No. of Hrs: 05

Automated Manufacturing: Components & working principle of CNC, advantages and applications.

Additive Manufacturing: Working principle of Additive manufacturing, Advantages and Applications.

Industrial robots: Anatomy, joints and links, Cartesian and polar configuration, Applications of Robots in material handling, processing, assembly and inspection.

Module 3 : Power Transmission	No. of Hrs: 05

Gear Drives: Types – Spur, Helical, Bevel, Worm and Rack & pinion, velocity ratio, simple and compound gear trains, Applications, numerical problems.

Belt Drives: Open and crossed belt drive, Types of belt (Flat and V-Belt), length of the belt and tension ratio (No derivations), Applications, numerical problems on velocity ratio and length of the belt.

Module 4 : Energy storage & management and Power plants	No. of Hrs: 06

Energy storage and management: types of energy storage, thermal energy storage: sensible heat storage and latent heat storage (simple numerical on sensible and latent heat storage), Energy management and principles of energy management.

Steam and Gas Power plant: working principle of steam power plant and gas power plant.

Module 5 : Internal Combustion Engines and E-Mobility	No. of Hrs: 05

IC Engines: Components and working principle of Four stroke SI Engine, Applications- Power generation, Agriculture, Marine, Automobiles and Aircraft propulsion, Performance of IC engines (numerical problems on IP, BP, Mechanical Efficiency and Thermal Efficiency).

Electric Vehicle: Components & working principle of EV, Advantages and disadvantages.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Compare the conventional and modern manufacturing techniques**.**

CO2: Explain the role of drives in power transmission and **make use of** the learnt concepts to **solve** problems on gear drives and belt drives.

CO3: Calculate the heat capacity of thermal energy storage system.

CO4: Evaluate the performance characteristics of IC engines and **Compare** the structure and working of fossil fuel driven vehicles with electric mobility.

TEXT BOOKS

1. K. R Gopala Krishna, 2008, *Elements of Mechanical Engineering*, Subash Publication.
2. A. K Babu, 2018, *Electric and Hybrid Vehicles*,1st Edition, Khanna Publishing House

REFERENCE BOOKS

1. Jonathan Wickert and Kemper Lewis, 2016, *an Introduction to Mechanical Engineering*, 4th Edition, Cengage Learning
2. P.N.Rao, 2003, *Manufacturing Technology- Foundry, Forming and Welding*, 3rd Ed., -Tata McGraw Hill
3. Karl T. Ulrich, Steven D Eppinger, 2011, *Product design and development*, 5th Ed. – McGraw - Hill Education;
4. Hazra Choudhry, 2010, *Elements of Workshop Technology*: (Vol.1): Media Promoters and Publishers Pvt. Ltd
5. Appu Kuttan K K, 2013, *Robotics*, I. K. International Pvt Ltd.

Web links:

1. Conventional Manufacturing: https://archive.nptel.ac.in/courses/112/107/112107219/
2. Computer Numerical Control : https://archive.nptel.ac.in/courses/112/105/112105211/
3. Video demonstration of Machine tool operations : https://www.makino.com/en-us/resources/content-library/videos
4. Additive Manufacturing: https://archive.nptel.ac.in/courses/112/103/112103306/
5. Robotics: https://archive.nptel.ac.in/courses/112/104/112104298/
6. Steam Turbines: https://archive.nptel.ac.in/courses/112/107/112107216/
7. Gas Turbines: https://archive.nptel.ac.in/courses/112/103/112103262/
8. Electric Vehicle Technology: https://archive.nptel.ac.in/courses/108/106/108106170/
9. Internal Combustion Engines: https://archive.nptel.ac.in/courses/112/103/112103262/

DESIGN THINKING			
Semester	I/II	CIE Marks	50
Course Code	23ESCC114	SEE Marks	50
Teaching Hours/Week (L:T:P)	(1:0:2)	Exam Hrs	2
Total Hours	37	Credits	2

Course Learning Objectives:

This Course is Designed:

1. To familiarize the concepts of design thinking for product and service development.
2. To explain fundamental concepts and tools of design thinking.
3. To highlight Design thinking process in modern industry, business & social sectors.
4. To discuss methods of implementing design thinking, involved in the real-world situations.

Module 1: Necessity of Design Thinking	No. of Hrs: 3

Necessity of Design Thinking – Challenges of Rapidly Changing Workplace - Survival Skills; Design Thinking and Why it Matters- Design and Business -More than a Process: DT Mindsets- Six Key Mindsets- other Mind sets.

Lab component/Activity(s)

1. Get into design thinking mindset

Module 2: Introduction to Design Thinking	No. of Hrs: 6

Introduction to Design Thinking – Definition, Features, Principles and Stages of Design Thinking, Benefits of Design Thinking.

Lab component/Activity(s)

1. Empathy phase (Partner interviews), Design & Ideate Phase (Go Broad to Go Narrow)
2. Sketch a prototype for the solution & Test

Module 3: Tools for Design Thinking	No. of Hrs: 12

Tools for Design Thinking – Visualization, Journey Mapping, Value Chain Analysis, Mind Mapping, Rapid Concept Development, Assumption Testing, Prototype, Co-creation, Learning Launches and Storytelling.

Lab component/Activity(s)

1. Empathy, Design & Ideate Phase for a Complex Scenario
2. Prototype Phase (Complex Scenario-1)
3. Testing Phase (Complex Scenario-1)
4. Presentation of the DT outcome (Complex Scenario-1)

Module 4: Design Thinking in Modern industry	No. of Hrs:12

Design Thinking in Modern industry, Business & Social Sector – Bringing DT to Business Process Modeling -Agile Methodology – Prototype vs Minimum Viable Product

Lab component/Activity(s)

1. Empathy, Design & Ideate Phase for a Complex Scenario
2. Prototype Phase (Complex Scenario-2)
3. Testing Phase (Complex Scenario-2)
4. Presentation of the DT outcome (Complex Scenario-2)

Module 5: Product & services Based Learning	**No. of Hrs: 4**
Product & Services Based Learning: Mapping Real World to the Classroom – Different Case Studies	

Course Outcomes:

At the end of the course, students will be able to:

CO1: Understand the methods and processes, of Design Thinking in Modern Industry, business & social sectors.

CO2: Apply Design Thinking approach and tools to modern world problems.

CO3: Analyze critical problems using design thinking mindset.

TEXT BOOKS

1. David Lee.(2018) *Design Thinking in the Classroom*, Ulysyspress , Berkeley CA, USA
2. Hasso Plattner, Christoph Meinel and Larry Leifer.(2011). *Design Thinking: Understand – Improve – Apply*, Springer.
3. Jeanne M. Liedtka.(2010).*Ten Tools for Design Thinking- Technical Notes* by, University of Virginia Darden School Foundation, Charlottesville,VA.

REFERENCE BOOKS

1. Walter Brenner, Falk Uebernickel. (2016). *"Design Thinking for Innovation learning* (International edition) Springer.
2. A. Telier ,Thomas Binder, Giorgio De Michelis, Pelle Ehn, Giulio Jacucci Per. (2011). *Design Things,* Massachusetts Institute of Technology.
3. Linde, and Ina Wagner. (2011).Tim Parsons, *Thinking: Objects Contemporary approaches to product design*, AVA Publishing SA.
4. Jeanne Liedtka , Andrew King , Kevin Bennett. (2013) . *Solving Problems with Design Thinking - Ten Stories of What Works* Columbia Business School Publishing.

Web links:

1. Harvard Business School: https://online.hbs.edu/blog/post/what-is-design-thinking
2. Design Thinking Overview: https://www.youtube.com/watch?v=gHGN6hs2gZY
3. DT Tools: https://www.designorate.com/design-thinking-tools-and-methods/
4. Agile methodology : https://www.youtube.com/watch?v=ZZ_vnqvW4DQ
5. Examples of DT : https://voltagecontrol.com/blog/8-great-design-thinking-examples/
6. DT Success stories : https://theaccidentaldesignthinker.com/2017/09/16/40-design-thinking-success-stories/

PROFESSIONAL COMMUNICATION			
Semester	I/II	CIE Marks	50
Course Code	23HMCC115	SEE Marks	50
Teaching Hours/Week (L:T:P)	1:0:2	Exam Hrs	02
Total Hours	37	Credits	02

Course Learning Objectives:

This course is designed to

1. Strengthen the Fundamentals of Communicative English.
2. Emphasize the importance of basic English grammar in English as a language.
3. Enhance art of letter-writing skills, master formats, email etiquette, and understand ethics.
4. Intensify English vocabulary and writing proficiency for communicative documents.
5. Impart professional communication skills required for career and Workplace.

Module 1: Introduction to communication	No. of Hrs: 7

Introduction- Importance and types of Communication-Spoken and Written Communication, Intra and Inter personal Communication, Group Communication, Public Communication-Role and Importance of English in the Corporate World - Importance of professional communication, Listening & Reading - Types, traits and importance of listening & Reading and Feedback techniques

Activity(s)

1.Situational Conversation
2.Story Reconstruction

Module 2: Communicative Grammar	No. of Hrs: 7

Revisit Parts of Speech- Articles, Subject-Verb Agreement, Tenses & Sequence of tense, Auxiliary verbs, Phrasal Verbs, Conjunctions and prepositions, Antonyms and synonyms, Cloze Test, Use of Idioms and phrases.

Activity(s)

1.Word Sort Game
2.Preposition Scavenger Hunt
3. Antonym-Synonym Bingo

Module 3: Written Communication	No. of Hrs: 7

Letter Writing- Introduction-Types of letters, Business letter (Formal/Professional) - Forms & Format, List of Business Letters-Official Letters, Demi official letters, Applications,

Letters to Newspapers, Associations & organizations

Resume and Cover Letter-Personal Letters- Relatives/Friends, Social Letters, Notes of Invitation Email etiquettes and professional ethics

Activity(s)

1 Résumé Review
2.Letter Writing exercise
3.Report Analysis.

Module 4: Advanced Vocabulary	**No. of Hrs: 8**

Identifying errors- sentences and often mispronounced and misspelt words, Principles of Paragraphs in Documents, Writing Introduction and Conclusion to a paragraph, Technical Report writing, Importance of Proper Punctuation, Précis writing, Writing Research and Review papers-structure and significance.

Activity(s)

1.Error Hunt

2.Reordering Exercise,

3.Punctuation Challenge

Module 5: Professional Communication	**No. of Hrs: 8**

Presentation skills- Strategies of Presentation (Formal Presentations by Students)–Interviews- types and preparation, mock interviews (Practice and Peer Feedback) Group Discussion

Activity(s)

1.Presentation Practice

2. Mock Interview Rotation

3. Group Discussion

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Communicate effectively in a professional setting, engage effectively in group discussions and debates, and uphold group discussion norms to facilitate effective communication.

CO2: Write grammatically accurate sentences, enhance the lexicon, compose polished professional documents, excel in diverse writing styles, and emphasize the importance of proper letter and email etiquette.

CO3: Demonstrate socially endorsed non-verbal communication methods, such as body language and gestures

TEXT BOOKS

1. Leech, Geoffrey, and Jan Svartvik, (2013) A *communicative grammar of English,* Routledge, Publication.
2. Geoffrey Leech, Margaret Deuchar & Robert Hoogenred (1982) *English Grammar for Today*, Macmillan.
3. Wren & Martin (2002) *High School English Grammar and Composition*-, New Delhi, S. Chand & Company Ltd.

REFERENCE BOOKS

1. Sanjay Kumar & Pushp Lata (2015) *Communication Skills,* Oxford University Press.
2. Raymond Murphy (1994) *Intermediate English Grammar,* Cambridge University Press.
3. Martin Hewings (2008) *Advance Grammar in Use,* Cambridge University Press.
4. Subroto Bagchi (2009) *The Professional,* Penguin India.

Web links:

1. Communication at Work - https://youtu.be/QGHBq5OEsBM
2. Basic English Grammar - https://youtu.be/d0wV9EC3t14
3. Writing Letters - formal & informal- https://youtu.be/PgwmAUJx248
4. Writing an Essay - https://youtu.be/liyFKUFCQno
5. Group Discussion -https://youtu.be/YY2yjEEoB3U