RSET
RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY
AUTONOMOUS

COURSE HANDOUT

BTech Autonomous – SEMESTER 1

RSET
RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

COLLEGE VISION

To evolve into a premier technological and research institution, moulding eminent professionals with creative minds, innovative ideas and sound practical skill, and to shape a future where technology works for the enrichment of mankind.

COLLEGE MISSION

To impart state-of-the-art knowledge to individuals in various technological disciplines and to inculcate in them a high degree of social consciousness and human values, thereby enabling them to face the challenges of life with courage and conviction.

DEPARTMENT VISION

The department strives to excel in the areas of academia, research and industry by moulding professionals in the field of Civil Engineering to build a sustainable world.

DEPARTMENT MISSION

To impart quality education and mould technically sound, ethically responsible professionals in the field of Civil Engineering with a broad skill set of creativity, critical thinking and effective communication skills to meet the desired needs of the society within realistic socio-economic environmental constraints.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Within a few years of graduation, the candidate is expected to have achieved the following objectives:

PEO 1: Knowledge in Civil Engineering: Graduates shall attain state of the art knowledge in the various fields of Civil Engineering and will take every opportunity coming their way to augment the already existing knowledge.

PEO 2: Successful in career: Graduates shall achieve successful career which they will be able to commit to with responsibility and passion.

PEO 3: Commitment to society: Graduates shall display a high sense of social responsibility and ethical thinking and suggest sustainable engineering solutions

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PROGRAMME OUTCOMES (POs)

Engineering Students will be able to be:

1. **Engineering Knowledge:** Apply the knowledge of Mathematics, Science, Engineering fundamentals, and Civil Engineering to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and Engineering sciences.
3. **Design/development of solutions:** Design solutions for complex Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex Engineering activities with an understanding of the limitations.
6. **The Engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable developments.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex Engineering activities with the Engineering Community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the Engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
12. **Life -long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

Civil Engineering Graduates will be able to:

PSO 1: Structural Analysis & Design Skills: Acquire ability to analyse, design and develop feasible solutions with emphasis to earthquake resistant design.

PSO 2: Professional Skills: Acquire ability to confront real time problems by developing sustainable solutions.

PSO 3: Interdisciplinary Skills: Graduates will be able to collaborate with engineers from other disciplines to develop products for the betterment of the society.

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CONTENTS

COURSE INFORMATION SHEETS OF **SEMESTER 1** COURSES

RSET
RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY
AUTONOMOUS

RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

COURSE INFORMATION SHEET

LINEAR ALGEBRA AND CALCULUS

DEGREE: BTECH	**COURSE**: LINEAR ALGEBRA ANDCALCULUS
PROGRAMME: CE	**COURSE CODE**: 100908MA100A
COLLEGE: RAJAGIRI SCHOOL OF ENGINEERING& TECHNOLOGY	**CONTACT HOURS**: 3+1 (Tutorial) hours/Week.
SEMESTER: 1	**CREDITS**: 4

SYLLABUS

UNIT	DETAILS	HOURS
I	Module 1 (Linear algebra) (Text 2: Relevant topics from sections 7.3, 7.4, 7.5, 8.1,8.3,8.4) Systems of linear equations, Solution by Gauss elimination, row echelon form and rank of a matrix,fundamental theorem for linear systems (homogeneous and non-homogeneous, without proof), Eigen values and eigen vectors. Diagonalization of matrices, orthogonal transformation, quadratic forms and their canonical forms.	**10**
II	Module 2 (multivariable calculus-Differentiation) (Text 1: Relevant topics from sections 13.3, 13.4, 13.5, 13.8) Concept of limit and continuity of functions of two variables, partial derivatives, Differentials, Local Linear approximations, chain rule, total derivative, Relative maxima and minima, Absolute maxima and minima on closed and bounded set.	**8**
III	Module 3(multivariable calculus-Integration) (Text 1: Relevant topics from sections 14.1, 14.2, 14.3, 14.5, 14.6, 14.8) Double integrals (Cartesian), reversing the order of integration, Change of coordinates (Cartesian topolar), finding areas and volume using double integrals, mass and centre of gravity ofinhomogeneous laminas using double integral. Triple integrals, volume calculated as triple integral,triple integral in cylindrical andspherical coordinates (computations involving spheres, cylinders).	**10**

IV	Module 4 (sequences and series) (Text 1: Relevant topics from sections 9.1, 9.3, 9.4, 9.5, 9.6) Convergence of sequences and series, convergence of geometric series and p-series (without proof), test of convergence (comparison, ratio and root tests without proof); Alternating series and Leibnitz test, absolute and conditional convergence.	**8**
V	Module 5 (Series representation of functions) (Text 1: Relevant topics from sections 9.8, 9.9. Text 2: Relevant topics from sections 11.1, 11.2,11.6) Taylor series (without proof, assuming the possibility of power series expansion in appropriate domains), Binomial series and series representation of exponential, trigonometric, logarithmic functions (without proofs of convergence); Fourier series, Euler formulas, Convergence of Fourier series (without proof), half range sine and cosine series, Parseval's theorem (without proof).	**9**
TOTAL HOURS		**45**

Text Books

1. H. Anton, I. Biven,S.Davis, "Calculus", Wiley, 10th edition, 2015.

2. Erwin Kreyszig, Advanced Engineering Mathematics, 10thEdition, John Wiley & Sons, 2016.

Reference Books

1. J. Stewart, Essential Calculus, Cengage, 2nd edition, 2017

2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9 th Edition, Pearson, Reprint, 2002.

3. Peter V. O'Neil, Advanced Engineering Mathematics, Cengage, 7th Edition, 2012

4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36 Edition, 2010.

COURSE PRE-REQUISITES

COURSE NAME	DESCRIPTION
A basic course in one-variable calculus and matrix theory.	To develop basic ideas on calculus matrix theory.

COURSE OBJECTIVES

1	To enable the students to acquire knowledge onsome basic mathematical ideas and tools which are atthe core of any engineering course.
2	To familiarize students with some basic techniques in matrix theory which are essential for analysing linear systems.

3	To familiarize the students with topicslike calculus of functions of one or more variables taught in this course are useful in modelling and analysing physical phenomena involving continuous change of variables or parameters and have applications across all branches of engineering.

COURSE OUTCOMES: After the completion of the course the student will be able to

SL.NO	DESCRIPTION
CO 1	Solve systems of linear equations, diagonalize matrices and characterise quadratic forms
CO 2	compute the partial and total derivatives and maxima and minima of multivariable functions
CO 3	compute multiple integrals and apply them to find areas and volumes of geometrical shapes,mass and centre of gravity of plane laminas
CO 4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
CO 5	determine the Taylor and Fourier series expansion of functions and learn their applications

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

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

JUSTIFICATIONS FOR CO-PO MAPPING

MAPPING	LOW/MEDIUM/ HIGH	JUSTIFICATION
CO1-PO1	3	Matrix theory will give a thorough knowledge in the application problems.
CO1-PO2	3	Matrix theory analyses various methods to solve linear equations.
CO1-PO3	3	Design solutions to engineering problems.
CO1-PO4	3	Analyses and interpret different data using

		matrix theory.
CO1-PO5	2	Apply appropriate techniques in modelling various complex engineering activates.
CO1-PO6	1	Fundamental knowledge in matrix theory help to assess various cultural issues relevant to the professional engineering practice.
CO1-PO9	1	Matrix theory helps an individual to function effectively in multidisciplinary settings.
CO1-PO10	2	Matrices are used in writing effective reports and design documentation.
CO1-PO12	2	Able to engage in independent and lifelong learning in the broadest context of technological change.
CO2-PO1	3	Basic knowledge in differential calculus of functions of several variables helps in solving engineering problems
CO2-PO2	3	Multivariable calculus can be applied to analyse deterministic systems that have multiple degrees of freedom.
CO2-PO3	3	Multivariable calculus is used in many fields of natural and social science and engineering to model and study high-dimensional systems.
CO2-PO4	3	Most of the natural phenomenon is non-linear and that can be best described by using multivariable calculus and differential equation.
CO2-PO5	2	Multivariable calculus can be used to optimise functions of two or more variables.
CO2-PO6	1	Helps to assess societal, health, safety legal and cultural issues.
CO2-PO9	1	Engineers directly use calculus in their daily practice and some use computer programs based on calculus that simplify engineering design.
CO2-PO10	2	Effective communication helps the engineering community to give and receive clear instructions.
CO2-PO12	2	Study, experience, and practice of multivariable calculus is applied with judgment to develop ways to utilize, economically.
CO3-PO1	3	Basic knowledge of multiple integrals is used to create mathematical models in order to

		arrive into an optimal solution.
CO3-PO2	3	Multiple integration helps to analyse complex engineering problems to reach substantiated conclusions.
CO3-PO3	3	Application of the double integrals helps in designing solutions for engineering problems.
CO3-PO4	3	The basic concepts of application integration develops and design a number of important issues in the research area.
CO3-PO5	2	Integration is used to create and apply appropriate techniques in solving engineering problems.
CO3-PO6	1	Integration helps us to find out the total cost function and total revenue function from the marginal cost.
CO3-PO9	1	Integration is used effectively in multi-disciplinary settings.
CO3-PO10	2	Effective presentations and clear instructions can be done using integration.
CO3-PO12	2	In the new era of technology, application of integration is used in independent and life-long learning.
CO4-PO1	3	Infinite series is applied in finding the solution of complex engineering problems.
CO4-PO2	2	Infinite series can be used as a tool in formulating various research related activities.
CO4-PO3	3	To meet the specified needs for the public health and safety, solutions of infinite series can be applied widely.
CO4-PO4	2	Various tests are used for interpreting and analysing the data in engineering field
CO4-PO5	1	Different tests of infinite series can be applied to select and create IT tools in modelling complex engineering activities.
CO4-PO6	1	Knowledge in various tests can be applied to assess societal, legal and cultural issues.
CO4-PO9	1	In multi-disciplinary settings, basic knowledge of infinite series and its related test helps to perform as a leader
CO4-PO10	2	To write effective reports and make effective presentations, the idea related to infinite series work as a tool.
CO4-PO12	2	Various tests in infinite series will enable to engage in life-long learning.

CO5-PO1	3	Knowledge in Taylor series provides different techniques in solving engineering problems.
CO5-PO2	3	Identify and analyse the signals in electronics and communication using Taylor series.
CO5-PO3	3	Fourier series can be used for designing system components.
CO5-PO4	3	Valid conclusions can be drawn from the synthesis of information.
CO5-PO5	2	Modern techniques are used in understanding the problems in the society.
CO5-PO6	1	Develop into a responsible engineer by assessing the knowledge in Taylor series
CO5-PO9	1	Mould an engineer with leadership quality in functioning effectively.
CO5-PO10	2	Knowledge acquired in Fourier series is an important tool in digital communication
CO5-PO12	2	Expansion of the series helps in enabling an individual to cop-up with the technological change.

JUSTIFICATIONS FOR CO-PSO MAPPING

MAPPING	*LOW/MEDIUM/ HIGH*	*JUSTIFICATION*
CO1-PSO1	3	Students will use basic knowledge in mathematics in the domain of engineering mechanics, thermal and fluid sciences to solve engineering problems utilizing advanced technology.
CO1-PSO2	2	Mathematical principles in calculus are used in design and analysis of mechanical systems.
CO2-PSO1	2	Phenomena involving continuous change of variables are used in thermal and fluid sciences.
CO5-PSO2	3	Students will use concept of vector valued functions in the design and analysis of mechanical systems.

GAPS IN THE SYLLABUS- TO MEET INDUSTRY / PROFESSION REQUIREMENTS

Sl no	Description	Proposed actions	Relevance
1	Basic concepts in limits and differential calculus	Reading	PO1 ,PSO2

2	Application of vector calculus	Reading	PO2, PSO2
3	Importance of double integrals and triple integrals	Reading	PO2, PSO2

TOPICS BEYOND SYLLABUS/ ADVANCED TOPICS/ DESIGN

Sl no	Description	Proposed actions	Relevance
1	Application of vector calculus in Engineering	Reading	PO2 ,PO3
2	Application of multiple integrals in Engineering	Reading	PO2, P03,PSO1

WEB SOURCES /ICT ENABLED TEACHING LEARNING RESOURSES.

The following open source software packages may be used as appropriate for practice and assignment problems

1) https://youtu.be/qNZxf0j41tw
2) https://youtu.be/4QFsiXfgbzM
3) https://youtu.be/ksS_yOK1vtk
4) https://youtu.be/vqJuFD0GdJA
5) https://tutorial.math.lamar.edu/
6) https://www.geogebra.org/3d?lang=en

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☑ **CHALK & TALK**	☑ **STUD. ASSIGNMENT**	☑ **WEB RESOURCES**	☐LCD/SMART BOARDS
☐ STUD. SEMINARS	☐ ADD-ON COURSES		

ASSESSMENT METHODOLOGIES-DIRECT

☑ **ASSIGNMENTS**	☐ STUD. SEMINARS	☑ **TESTS/MODEL EXAMS**	☑ **UNIV. EXAMINATION**
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

☑ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☑ STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

COURSE INFORMATION SHEET

ENGINEERING PHYSICS

PROGRAMME: CE	**DEGREE: BTECH**
COURSE: ENGINEERING PHYSICS	**SEMESTER: 1 CREDITS: 4**
COURSE CODE: 100902/PH900B **REGULATION: 2020**	**COURSE TYPE: CORE**
COURSE AREA/DOMAIN: Engineering Physics	**CONTACT HOURS: 4(L) hours/Week.**
CORRESPONDING LAB COURSE CODE : 100908/PH922S	**LAB COURSE NAME: Engineering Physics Lab**

The aim of the Engineering Physics Program is to offer students a solid background in the fundamentals of Physics and to impart that knowledge in engineering disciplines. The program is designed to develop scientific attitudes and enable the students to correlate the concepts of Physics with the core programmes

Prerequisite: Higher secondary level Physics, Mathematical course on vector calculus, differential equations and linear algebra

Course Contents and Lecture Schedule

No	Topic	No. of Lectures
1	**Oscillations and Waves (9 hours)**	
1.1	Harmonic oscillations, Damped harmonic motion-Derivation of differential equation and its solution, Over damped, Critically dampedand Under damped Cases, Quality factor-Expression	2 hrs
1.2	Forced oscillations-Differential Equation-Derivation of expressions for amplitude and phase of forced oscillations, Amplitude Resonance- Expression for Resonant frequency, Quality factor and Sharpness ofResonance, Electrical analogy of mechanical oscillators	3hrs
1.3	Wave motion- Derivation of one dimensional wave equation and itssolution, Three dimensional wave equation and its solution (no derivation)	2 hrs
1.4	Distinction between transverse and longitudinal waves. Transversevibration in a stretched string, Statement of laws of vibration	2 hrs
2	**Wave Optics (9 hours)**	
2.1	Interference of light-Principle of superposition of waves, Theory of thin films - Cosine law (Reflected system), Derivation of the conditions of constructive and destructive Interference	2 hrs
2.2	Interference due to wedge shaped films -Determination of thicknessand test for optical planeness, Newton's rings - Measurement of wavelength and refractive index, Antireflection coatings	4 hr
2.3	Diffraction of light, Fresnel and Fraunhofer classes of diffraction,Diffraction grating-Grating equation	2 hrs

2.4	Rayleigh criterion for limit of resolution, Resolving and Dispersive power of a grating with expression (no derivation)	1 hr
3	**Quantum Mechanics & Nanotechnology (9hours)**	
3.1	Introduction for the need of Quantum mechanics, Wave nature of Particles, Uncertainty principle, Applications-Absence of electronsinside a nucleus and Natural line broadening mechanism	2 hrs
3.2	Formulation of time dependent and independent Schrodinger wave equations-Physical Meaning of wave function, Particle in a one dimensional box- Derivation for normalised wave function and energy eigen values, Quantum Mechanical Tunnelling (Qualitative)	4 hrs
3.3	Introduction to nanoscience and technology, Increase in surface to volume ratio for nanomaterials, Quantum confinement in one dimension, two dimension and three dimension-Nano sheets, Nano wires and Quantum dots	2 hrs
3.4	Properties of nanomaterials-mechanical, electrical and opticalApplications of nanotechnology (qualitative ideas)	1 hr
4	**Acoustics & Ultrasonics (9hrs)**	
4.1	Acoustics, Classification of sound-Musical sound-Noise, Characteristics of Musical Sounds-Pitch or frequency-Loudness or Intensity- Measurement of Intensity level-Decibel-Quality or timbre, Absorption coefficient, Reverberation-Reverberation time-Significance- Sabine's formula (no derivation)	3 hrs
4.2	Factors affecting architectural acoustics and their remedies	1 hr
4.3	Ultrasonics-Production- Magnetostriction effect and Piezoelectric effect, Magnetostriction oscillator and Piezoelectric oscillator –Working, Detection of ultrasonic waves - Thermal and Piezoelectric methods	3 hrs
4.4	Ultrasonic diffractometer- Expression for the velocity of ultrasonic waves in a liquid, Applications of ultrasonic waves -SONAR, NDT and Medical.	2 hrs
5	**Laser and Fibre optics (9hours)**	
5.1	Properties of laser, Absorption and emission of radiation, Spontaneous and stimulated emission, Einstein's coefficients (no derivation), Population inversion, Metastable states, basic components of laser, Active medium, Pumping mechanism, Optical resonant cavity, working principle	2 hrs
5.2	Construction and working of Ruby laser and Helium neon laser ,Construction and working of semiconductor laser(Qualitative) Applications of laser	3 hrs
5.3	Holography, Difference between hologram and photograph, Recording of hologram and reconstruction of image, Applications	1 hrs
5.4	Optic fibre-Principle of propagation of light, Types of fibres-Step index and Graded index fibres, Numerical aperture –Derivation, Fibre optic communication system (block diagram), Industrial, Medical and Technological applications, Fibre optic sensors-Intensity Modulated and Phase modulated sensors	3 hrs
		TOTAL **45 hrs**

Text Books

1. M.N.Avadhanulu, P.G.Kshirsagar,TVSArun Murthy "A Text book of Engineering Physics", S.Chand&Co., Revised Edition 2019
2. H.K.Malik , A.K. Singh, "Engineering Physics" McGraw Hill Education, Second Edition 2017

Reference Books

1. Arthur Beiser, "Concepts of Modern Physics ", Tata McGraw Hill Publications, 6th Edition 2003
2. D.K. Bhattacharya, PoonamTandon, "Engineering Physics", Oxford University Press, 2015
3. Md.N.Khan&S.Panigrahi "Principles of Engineering Physics 1&2", Cambridge University Press,2016
4. Aruldhas G., "Engineering Physics", PHI Pvt. Ltd., 2015
5. AjoyGhatak, "Optics", Mc Graw Hill Education, Sixth Edition, 2017
6. T. Pradeep, "Nano:The Essentials'', McGraw Hill India Ltd, 2007
7. Halliday, Resnick, Walker, "Fundamentals of Physics'', John Wiley &Sons.Inc, 2001
8. Premlet B., "Advanced Engineering Physics", Phasor Books,10th edition,2017
9. I. Dominic and. A. Nahari, "A Text Book of Engineering physics", Owl Books Publishers, Revised edition, 2016

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

CO 1	Compute the quantitative aspects of waves and oscillations in engineering systems.
CO 2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
CO 3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
CO 4	Apply the knowledge of ultrasonic in NDT and use the principles of Acoustics to explain the nature and characterisation of acoustic design and provide a safe and healthy environment
CO 5	Apply the comprehended knowledge about LASER and fibre optic communication system in various engineering application

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	2						1	2			1
CO 2	3	2						1	2			1
CO 3	3	2						1	2			1
CO 4	3	1						1	2			1
CO 5	3	1						1	2			1

Justification

CO1.PO1	**Compute the quantitative aspects of waves and oscillations in engineering systems** like natural frequency, damped frequency, forced frequency, resonant frequency, band-width, Q-factor, wavelength, wave-velocity, frequency etc.
CO1.PO2	Review research literature to identify physics behind current and relevant innovations in the respective branch by assignment
CO1.PO8	Professional punctuality and understanding professional ethics by self-reading
CO1.PO9	Effectively function individually and as a team in various class presentations
CO1.PO12	Capture the current and relevant innovations in the respective branch

CO2.PO1	**Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments**. E.g.: measurement of fringewidth, refractive index, path difference, phase difference, annihilation of reflection by interference, angle of diffraction, grating element: its dispersive power and resolving power
CO2.PO2	Review research literature to identify physics behind current and relevant innovations in the respective branch by assignment
CO2.PO8	Professional punctuality and understanding professional ethics by self-reading
CO2.PO9	Effectively function individually and as a team in various class presentations
CO2.PO12	Capture the current and relevant innovations in the respective branch

CO3.PO1	**Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.** E.g.: Wave-function and it's physical significance, Excitons, Schrodinger equations and application to particle in a one dimensional box, Energy Eigen values, tunneling, Quantum confinement, properties of nanomaterials
CO3.PO2	Review research literature to identify physics behind current and relevant innovations in the respective branch by assignment
CO3.PO8	Professional punctuality and understanding professional ethics by self-reading
CO3.PO9	Effectively function individually and as a team in various class presentations
CO3.PO12	Capture the current and relevant innovations in the respective branch

CO4.PO1	**Apply the knowledge of ultrasonic in NDT and use the principles of Acoustics to explain the nature and characterization of acoustic design and provide a safe and healthy environment**
CO4.PO2	Review research literature to identify physics behind current and relevant innovations in the respective branch by assignment
CO4.PO8	Professional punctuality and understanding professional ethics by self-reading
CO4.PO9	Effectively function individually and as a team in various class presentations
CO4.PO12	Capture the current and relevant innovations in the respective branch

CO5.PO1	**Apply the comprehended knowledge about LASER and fibre optic communication system in various engineering application**
CO5.PO2	Review research literature to identify physics behind current and relevant innovations in the respective branch by assignment
CO5.PO8	Professional punctuality and understanding professional ethics by self-reading
CO5.PO9	Effectively function individually and as a team in various class presentations
CO5.PO12	Capture the current and relevant innovations in the respective branch

WEB SOURCE REFERENCES:

1	http://www.animations.physics.unsw.edu.au/jw/oscillations.htm
2	http://www.itp.uni-hannover.de/~zawischa/ITP/diffraction.html
3	http://science.howstuffworks.com/environmental/energy/superconductivity.htm
4	http://plato.stanford.edu/entries/qm/
5	http://www.damtp.cam.ac.uk/user/tong/statphys.html
6	http://www.coherent.com/products/?834/Lasers

Mark distribution for the course

Total Marks	CIE marks	ESE marks	ESE Duration
150	50	100	3 hours

Continuous Internal Evaluation Pattern:

Attendance : 10 marks

Continuous Assessment Test (2 numbers) : 25 marks

Assignment/Quiz/Course project : 15 marks

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	Test 1 (Marks)	Test 2 (Marks)	
Remember	15	15	30
Understand	25	25	50
Apply	10	10	20

ASSESSMENT METHODOLOGIES-DIRECT

☐ **ASSIGNMENTS**	☐ STUD. SEMINARS	☐ **TESTS/MODEL EXAMS**	☐ **UNIV. EXAMINATION**
☐ **STUD. LAB PRACTICES**	☐ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS	☐ POSTER PRESENTATIONS	

ASSESSMENT METHODOLOGIES-INDIRECT

☐ **ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)**	☐ **STUDENT FEEDBACK ON FACULTY (TWICE)**
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

COURSE INFORMATION SHEET

ENGINEERING MECHANICS

PROGRAMME: CE	**DEGREE**: BTECH
COURSE: ENGINEERING MECHANICS	**SEMESTER:** 1 **L-T-P-CREDITS**: 2-1-0-3
COURSE CODE: 100908/CE900C **REGULATION**: 2020	**COURSE TYPE**: BASIC
COURSE AREA/DOMAIN: ENGINEERING SCIENCE	**CONTACT HOURS**: 3+1(tutorial) hours/Week
CORRESPONDING LAB COURSE CODE (IF ANY): NIL	**LAB COURSE NAME**: NIL

SYLLABUS:

MODULE	DETAILS	HOURS
I	Introduction to Engineering Mechanics – statics – basic principles of statics – Parallelogram law, equilibrium law, principles of superposition and transmissibility, law of action and reaction (review), free body diagrams. Concurrent coplanar forces – composition and resolution of forces – resultant and equilibrium equations – methods of projections – methods of moments – Varignon's Theorem of moments.	7
II	Friction – sliding friction – Coulomb's laws of friction – analysis of single bodies – wedges, ladder analysis of connected bodies. Parallel coplanar forces – couple – resultant of parallel forces – centre of parallel forces – equilibrium of parallel forces – Simple beam subject to concentrated vertical loads. General coplanar force system – resultant and equilibrium equations.	7
III	Centroid of composite areas- – moment of inertia – parallel axis and perpendicular axis theorems. Polar moment of inertia, radius of gyration, mass moment of inertia – ring, cylinder and disc. Theorem of Pappus Guldinus(demonstration only) Forces in space – vectorial representation of forces, moments and couples – resultant and equilibrium equations – concurrent forces in space (simple problems only)	7
IV	Dynamics – rectilinear translation – equations of kinematics (review) Kinetics – equation of motion – D'Alembert's principle – motion on horizontal and inclined surfaces, motion of connected bodies. Impulse momentum equation and work energy equation (concepts only).	7

	Curvilinear translation – equations of kinematics – projectile motion (review), kinetics – equation of motion. Moment of momentum and work energy equation (concepts only).	
V	Rotation – kinematics of rotation – equation of motion for a rigid body rotating about a fixed axis – rotation under a constant moment. Plane motion of rigid body – instantaneous centre of rotation (concept only). Simple harmonic motion – free vibration – degree of freedom – undamped free vibration of spring mass system – effect of damping (concept only)	7
TOTAL HOURS		35

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T1	Timoshenko and Young, Engineering Mechanics, McGraw Hill Publishers
T2	Shames, I. H., Engineering Mechanics – Statics and Dynamics, Prentice Hall of India.
T3	R. C. Hibbeler and Ashok Gupta, Engineering Mechanics, Vol. I statics, Vol II Dynamics, Pearson Education.
R1	Merriam J. L and Kraige L. G., Engineering Mechanics – Vols. 1 and 2, John Wiley.
R2	Tayal A K, Engineering Mechanics – Statics and Dynamics, Umesh Publications
R3	Bhavikkatti, S.S., Engineering Mechanics, New Age International Publishers
R4	F.P.Beer abd E.R.Johnston (2011), Vector Mechanics for Engineers, Vol.I – Statics, Vol.II – Dynamics, 9th Ed, Tata McGraw Hill
R5	Rajasekaran S and Sankarasubramanian G, Engineering Mechanics - Statics and Dynamics, Vikas Publishing House Pvt Ltd.

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEMESTER
	NIL		

COURSE OBJECTIVES:

1	To expose the students to the fundamental concepts of mechanics and enhance their problem-solving skills.
2	It introduces students to the influence of applied force system and the geometrical properties of the rigid bodies while stationary or in motion.
3	After this course students will be able to recognize similar problems in real-world situations and respond accordingly.

COURSE OUTCOMES:

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

Sl No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	***Recall*** principles and theorems related to rigid body mechanics														
	2	2											1		
2	***Identify*** and ***describe*** the components of system of forces acting on the rigid body														
	3	3											2		
3	***Apply*** the conditions of equilibrium to various practical problems involving different force system.														
	3	3											1		
4	***Choose*** appropriate theorems, principles or formulae to solve problems of mechanics.														
	3	3											2		
5	***Solve*** problems involving rigid bodies, applying the properties of distributed areas and masses														
	3	3											1		

JUSTIFICATION FOR CO-PO-PSO MAPPING:

CO	PO	MAPPING	JUSTIFICATION
CO1	PO1	MEDIUM	Principles and theorems related to rigid body mechanics are applied to solve engineering problems
	PO2	MEDIUM	Principles and theorems related to rigid body mechanics are used to identify, formulate, and analyze complex engineering problems
	PSO1	LOW	Principles and theorems related to rigid body mechanics are applied to analyse, design and develop feasible solutions with emphasis to earthquake resistant design
CO2	PO1	HIGH	Components of system of forces acting on the rigid body

			are used to solve engineering problems
	PO2	HIGH	Components of system of forces acting on the rigid body used to identify, formulate, and analyze complex engineering problems
	PSO1	LOW	Components of system of forces acting on the rigid body are used to analyse, design and develop feasible solutions with emphasis to earthquake resistant design
CO3	PO1	HIGH	Conditions of equilibrium are important in solving engineering problems
	PO2	HIGH	Conditions of equilibrium used to formulate and analyze complex engineering problems
	PSO1	LOW	Conditions of equilibrium are important in solving engineering problems
CO4	PO1	HIGH	Theorems, principles or formulae should be appropriately used to solve engineering problems
	PO2	HIGH	Theorems, principles or formulae should be appropriately used to formulate, review research literature, and analyze complex engineering problems
	PSO1	LOW	Theorems, principles or formulae should be appropriately used to analyse, design and develop feasible solutions with emphasis to earthquake resistant design
CO5	PO1	HIGH	Knowledge in the properties of distributed areas and masses is necessary to solve engineering problems
	PO2	HIGH	Properties of distributed areas and masses is used to identify, formulate, and analyze complex engineering problems
	PSO1	LOW	Knowledge in the properties of distributed areas and masses is necessary to analyse, design and develop feasible solutions with emphasis to earthquake resistant design

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

Sl No	DESCRIPTION	PROPOSED ACTIONS	RELEVANT POs
1	Product of Inertia	NPTEL & Additional Study Materials Shared	PO1, PO2
2	Problems on theorem of Pappus Guldinus		
3	Problems on instantaneous centre		

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

Sl No	DESCRIPTION
1	Principle of Virtual Work
2	Simple Pendulum

WEB SOURCE REFERENCES:

Sl No	DESCRIPTION
1	www.nptel.ac.in/courses/112/106/112106286/ https://nptel.ac.in/courses/122/104/122104014/ https://nptel.ac.in/courses/112/103/112103108/

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

CHALK & TALK	☑	**STUD. ASSIGNMENT**	☑	**WEB RESOURCES**	☑
LCD/SMART BOARDS	☑	STUD. SEMINARS		ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

ASSIGNMENTS	☑	STUD. SEMINARS		**TESTS/MODEL EXAMS**	☑	**UNIV. EXAMINATION**	☑
STUD. LAB PRACTICES		STUD. VIVA		MINI/MAJOR PROJECTS		CERTIFICATIONS	
ADD-ON COURSES		OTHERS					

ASSESSMENT METHODOLOGIES-INDIRECT

ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☑	**STUDENT FEEDBACK ON FACULTY (TWICE)**	☑
ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS		OTHERS	

COURSE INFORMATION SHEET

BASICS OF ELECTRICAL ENGINEERING

PROGRAMME: **CE/CSE/ME**	DEGREE: **BTECH**
COURSE: **Basics of Electrical Engineering**	SEMESTER: 1 CREDITS: **3**
COURSE CODE: REGULATION: **2020 UG**	COURSE TYPE: **CORE**
COURSEAREA/DOMAIN: **Electrical Engineering**	CONTACT HOURS: **2+1 (Lecture hours/Week.)**
CORRESPONDING LAB COURSE CODE (IF ANY):**Yes**	LAB COURSE NAME: **Electrical Workshop**

SYLLABUS:

UNIT	DETAILS	HOURS
I	MODULE 1: Elementary Concepts of Electric Circuits Elementary concepts of DC electric circuits: Basic Terminology including voltage, current, power, resistance, emf; Resistances in series and parallel; Current and Voltage Division Rules; Capacitors & Inductors: V-I relations and energy stored. Ohms Law and Kirchhoff's laws-Problems; Star-delta conversion (resistive networks only-derivation not required)-problems. Analysis of DC electric circuits: Mesh current method - Matrix representation - Solution of network equations. Node voltage methods-matrix representation-solution of network equations by matrix methods. Numerical problems.	8
II	MODULE 2: Elementary Concepts of Magnetic circuits, Electromagnetic Induction and AC fundamentals Magnetic Circuits: Basic Terminology: MMF, field strength, flux density, reluctance - comparison between electric and magnetic circuits- Series and parallel magnetic circuits with composite materials, numerical problems. Electromagnetic Induction: Faraday's laws, problems, Lenz's law- statically induced and dynamically induced emfs - Self-inductance and mutual inductance, coefficient of coupling Alternating Current fundamentals: Generation of alternating voltages-Representation of sinusoidal waveforms: frequency, period, Average, RMS values and form factor of waveforms-Numerical Problems.	8
III	MODULE 3: AC Circuits AC Circuits: Phasor representation of sinusoidal quantities. Trignometric, Rectangular, Polar and complex forms. Analysis of simple AC circuits: Purely resistive, inductive & capacitive circuits; Inductive and capacitive reactance, concept of impedance. Average Power Power factor. Analysis of RL, RC and RLC series circuits-active, reactive and apparent power. Simple numerical problems. Three phase AC systems: Generation of three phase voltages; advantages of three phase systems, star and delta connections (balanced only), relation between line and phase voltages, line and phase currents-Numerical problems	8
	TOTAL HOURS	24

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	1. D P Kothari and I J Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
T	2. D C Kulshreshtha, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
T	3. ChinmoySaha, ArindhamHalder and DebaratiGanguly, Basic Electronics - Principles and Applications, Cambridge University Press, 2018.
T	4. M.S.Sukhija and T.K.Nagsarkar, Basic Electrical and Electronics Engineering, Oxford University Press, 2012.
T	5. Wayne Tomasi and Neil Storey, A Textbook On Basic Communication and Information Engineering, Pearson, 2010.
R	1. Del Toro V, “Electrical Engineering Fundamentals”, Pearson Education..
R	2. T. K. Nagsarkar, M. S. Sukhija, “Basic Electrical Engineering”, Oxford Higher Education.
R	3. Hayt W H, Kemmerly J E, and Durbin S M, “Engineering Circuit Analysis”, Tata McGraw-Hill
R	4. Hughes, “Electrical and Electronic Technology”, Pearson Education.
R	5. V. N. Mittle and Arvind Mittal, “Basic Electrical Engineering,” Second Edition, McGraw Hill.
R	6. Parker and Smith, “Problems in Electrical Engineering”, CBS Publishers and Distributors.
R	7. S. B. Lal Seksena and KaustuvDasgupta, “Fundamentals of Electrical Engineering”, Cambridge University Press.
R	8. Anant Agarwal, Jeffrey Lang, Foundations of Analog and Digital Electronic Circuits, Morgan Kaufmann Publishers, 2005
R	9. Bernard Grob, Ba sic Electronics, McGraw Hill.

R	10. A. Bruce Carlson, Paul B. Crilly, Communication Systems: An Introduction to Signals and Noise in Electrical Communication, Tata McGraw Hill, 5th Edition.

COURSE PRE-REQUISITES:

COURSE NAME	DESCRIPTION
11^{th} and 12^{th} Standard Physics and Mathematics	A thorough knowledge of 11^{th} and 12^{th} standard Physics and Mathematics

COURSE OBJECTIVES:

1	To equip students of all branches of Engineering with an understanding of the fundamental principles of Electrical Engineering
2	To prepare students for learning advanced topics in Electrical Engineering

COURSE OUTCOMES:

Sl. No.	DESCRIPTION
1	Students will be able to apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits
2	Students will be able to develop and solve models of magnetic circuits
3	Students will be able toapply the fundamental laws of electrical engineering to solve simple ac circuits in steady state

Sl. No.	DESCRIPTION	BLOOMS' TAXONOMY LEVEL
1	Students will be able to apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits	Application[Level 3]
2	Students will be able to develop and solve models of magnetic circuits	Comprehension [Level 2]
3	Students will be able to apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state	Application [Level 3]

MAPPING COURSE OUTCOMES (COs) – PROGRAM OUTCOMES (POs) AND COURSE OUTCOMES (COs) – PROGRAM SPECIFIC OUTCOMES (PSOs):

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
C130.1	3	1										2		1	
C130.2	3	1										2		1	
C130.3	3	1										2		1	
EST 130	**3**	**1**										**2**			

JUSTIFATIONS FOR CO-PO MAPPING:

Mapping	L/H/M	Justification
C130.1-PO1	H	Students will be apply the knowledge of mathematics and science to solve various fundamental problems in simple DC circuits.
C130.1-PO2	L	Students will be able to formulate and analyze to find solution for circuit related problems in their higher semesters.
C130.1-PO12	M	Students will be able to recognize the need for life long learning in the broadest context of techonological change in the area of Electric circuits
C130.2-PO1	H	Students will be able to apply knowledge of magnetic circuits to solve engineering problems.

C130.2-PO2	L	Students will be able to analyze complex engineering problems using the first principles of magnetic circuits.
C130.2-PO12	M	Students will be able to do life long learning in the techonological change in the area of application of Magnetic circuits
C130.3-PO1	H	Students will be apply the knowledge of engineering fundamentals to solve complex problems in ac circuits.
C130.3-PO2	L	Students will be able to analyze complex engineering problems using the first principles of simple AC circuits.
C130.3-PO12	M	Students will be able to do life long learning in the techonological change in the area of application of AC circuits

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

Sl. No.	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Introduction to Dependent Sources	Additional Class with Tutorials	1,2,12	2

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

SI. No.	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Basic principles of DC and AC Machines and their application	Additional Class	1,2,12	2

WEB SOURCE REFERENCES:

1	http://nptel.iitm.ac.in/

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☑CHALK & TALK	☐STUD. ASSIGNMENT	☐ WEB RESOURCES	
☑ LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

☑ ASSIGNMENTS	☐ STUD. SEMINARS	☑ TESTS/MODEL EXAMS	☑ UNIV. EXAMINATION
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

☑ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☑ STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

COURSE INFORMATION SHEET

BASICS OF ELECTRONICS ENGINEERING

PROGRAMME: Civil Engineering	DEGREE: B.Tech
COURSE: BASICS OF ELECTRONICS ENGINEERING	SEMESTER: 1 CREDITS: 4
COURSE CODE: 100908/CO900F REGULATION: 2020	COURSE TYPE: CORE
COURSE AREA/DOMAIN: ELECTRICAL AND ELECTRONICS ENGINEERING	CONTACT HOURS: 4 hours /Week.
CORRESPONDING LAB COURSE CODE (IF ANY):	LAB COURSE NAME: ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP

SYLLABUS (PART-II):

UNIT	DETAILS	HOURS
1.	MODULE 4 Introduction to Semiconductor devices: Evolution of electronics – Vacuum tubes to nano electronics. Resistors, Capacitors and Inductors (constructional features not required): types, specifications. Standard values, color coding. PN Junction diode: Principle of operation, V-I characteristics, principle of avalanche breakdown. Bipolar Junction Transistors: PNP and NPN structures, Principle of operation, relation between current gains in CE, CB and CC, input and output characteristics of common emitter configuration.	10
2.	MODULE 5 Basic electronic circuits and instrumentation: Rectifiers and power supplies: Block diagram description of a dc power supply, Working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response, Concept of voltage divider biasing. Electronic Instrumentation: Block diagram of an electronic instrumentation system.	8
3.	MODULE 6 Introduction to Communication Systems: Evolution of communication systems – Telegraphy to 5G. Radio communication: principle of AM & FM, frequency bands used for various communication systems, block diagram of super heterodyne receiver, Principle of antenna – radiation from accelerated charge. Mobile communication: basic principles of	7

	cellular communications, principle and block diagram of GSM.	
	TOTAL HOURS	N.A

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
1.	Electronic Devices and Circuits/Bell. D. A/Oxford University Press
2.	Electronic Devices and Circuit Theory/Boylested, R.L Nashelsky/Pearson Education
3.	Basic Electronic Devices, Circuits and Fundamentals/Kal. S/PHI Learning
4.	Integrated Electronics/Millman J, Hawkins C and Parikhu C D/Tata McGraw Hill
5.	Electronics Circuit Analysis and Design/ Neeman D.A/ Tata McGraw Hill
6.	Microelectronic Circuits/Sedra A S and Smith K C/Oxford University Press

COURSE PRE-REQUISITES: NIL

COURSE OBJECTIVES:

1	To get basic idea about types, specification and common values of passive and active components.
2	To familiarize the working of diodes and transistors
3	To understand the working of rectifiers and amplifiers
4	To provide an overview of evolution of communication systems, and introduce the basic concepts in radio communication

COURSE OUTCOMES:

Sl. No.	DESCRIPTION
CO 1	Identify the different passive components used in electronic industry for common application, Familiarize with the working of PN junction diode & BJT, Describe working of a voltage amplifier
CO 2	Design of simple circuits using diodes like rectifiers and voltage regulators. Outline the principle of an electronic instrumentation system
CO 3	Explain the principle of radio and cellular communication

CO-PO-PSO MAPPING:

	Programme Outcomes (POs)	Programme-specific

													Outcomes (PSOs)		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO 2	2	-	-	-	-	-	-	-	-	-	-	2	1	-	-
CO 3	2	-	-	-	-	-	-	-	-	-	-	2	2	-	-
ESL 130															

JUSTIFICATION FOR CO-PO-PSO CORRELATION:

	PO1	PO12	PSO1
CO1	A apply the basic knowledge of passive and active components		Acquire basic knowledge of basic electronic components and its operation, needed for problem analysis
CO2	Acquire a basic knowledge of rectifiers, regulators and instrumentation	Motivate the students to further explore their knowledge to quickly adapt to technology changes	Basic understanding of voltage regulators & instrumentation helps in analyzing wide range of problems
CO 3	Apply the basic knowledge of radio communication in solving problems encountered	Motivate the students to further explore their knowledge to quickly adapt to technology changes	Knowledge of radio communication helps in development of algorithms suitable for the mobile, IoT applications

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SNO	DESCRIPTION	PROPOSED ACTIONS
1	(Not identified)	(N. A.)

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

1.	Hobby circuits to practice

WEB SOURCE REFERENCES:

1	*https://nptel.ac.in/courses/117103063/*
2	*http://opencircuitdesign.com/xcircuit/*
3	*www.electronics-tutorials.ws*
4	*https://www.pcbway.com/blog/Engineering_Technical/Analysis_of_the_Methods_of_PCB_Interconnection.html*
5	*https://www.electronics-notes.com/articles/electronic_components/*

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☐ CHALK & TALK	☐ ~~STUD. ASSIGNMENT~~	☐ WEB RESOURCES	
☐ LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

☐ ~~ASSIGNMENTS~~	☐ ~~STUD. SEMINARS~~	☐ TESTS/MODEL EXAMS	☐ ~~UNIV. EXAMINATION~~
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ ~~MINI/MAJOR PROJECTS~~	☐ ~~CERTIFICATIONS~~
☐ ~~ADD-ON COURSES~~	☐ ~~OTHERS~~		

ASSESSMENT METHODOLOGIES-INDIRECT

☐ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☐ STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ~~ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS~~	☐ ~~OTHERS~~

RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

COURSE INFORMATION SHEET

LIFE SKILLS

PROGRAMME: CE	**DEGREE: B.TECH**
COURSE: LIFE SKILLS	**SEMESTER: I**
COURSE CODE: 100908/EN100E **REGULATION: 2019**	**COURSE TYPE: MANDATORY NON-CREDIT**
COURSE AREA/DOMAIN: HUMANITIES	**CONTACT HOURS: 4 hours/week – 2 L + 2P**

SYLLABUS:

UNIT	DETAILS
I	Overview of Life Skills: Meaning and significance of life skills, Life skills identified by WHO: Self-awareness, Empathy, Critical thinking, Creative thinking, decision making, problem-solving, Effective communication, interpersonal relationship, coping with stress, coping with emotion. Life skills for professionals: positive thinking, right attitude, attention to detail, having the big picture, learning skills, research skills, perseverance, setting goals and achieving them, helping others, leadership, motivation, self-motivation, and motivating others, personality development, IQ, EQ, and SQ
II	Self-awareness: definition, need for self-awareness; Coping With Stress and Emotions, Human Values, tools and techniques of SA: questionnaires, journaling, reflective questions, meditation, mindfulness, psychometric tests, feedback. Stress Management: Stress, reasons and effects, identifying stress, stress diaries, the four A's of stress management, techniques, Approaches: action-oriented, emotion-oriented, acceptance oriented, resilience, Gratitude Training, Coping with emotions: Identifying and managing emotions, harmful ways of dealing with emotions, PATH method and relaxation techniques. Morals, Values and Ethics: Integrity, Civic Virtue, Respect for Others, Living Peacefully. Caring, Sharing, Honesty, Courage, Valuing Time, time management, Co operation, Commitment, Empathy, Self-Confidence, Character, Spirituality, Avoiding Procrastination, Sense of Engineering Ethics.
III	21st century skills: Creativity, Critical Thinking, Collaboration, Problem-Solving, Decision Making, Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity, Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence. Steps in problem-solving: Problem-Solving Techniques, Six Thinking Hats, Mind Mapping, Forced Connections. Analytical Thinking, Numeric, symbolic, and graphic reasoning. Scientific temperament and Logical thinking.
IV	Group and Team Dynamics: Introduction to Groups: Composition, formation, Cycle, thinking, Clarifying expectations, Problem-Solving, Consensus, Dynamics techniques, Group vs Team, Team Dynamics, Virtual Teams. Managing team performance and managing conflicts, Intrapreneurship.
V	Leadership: Leadership framework, entrepreneurial and moral leadership, vision, cultural dimensions. Growing as a leader, turnaround leadership, managing diverse stakeholders, crisis management.
LAB	Verbal Effective communication and Presentation skills. Different kinds of communication; Flow of communication; Communication networks, Types of barriers; Miscommunication Introduction to presentations and group discussions. Learning styles: visual, aural, verbal, kinaesthetic, logical, social, solitary; Previewing, KWL table, active listening, REAP method Note-taking skills: outlining, non-linear note-taking methods, Cornell notes, three column note taking. Memory techniques: mnemonics, association, flashcards, keywords, outlines, spider diagrams and mind maps, spaced repetition. Time management: auditing, identifying time wasters, managing distractions, calendars and checklists; Prioritizing - Goal setting, SMART goals; Productivity tools and apps, Pomodoro technique.
LAB	Non-Verbal: Non-verbal Communication and Body Language: Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language, Communication in a multi cultural environment.

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
R	Shiv Khera, "*You Can Win"*, Macmillan Books, New York, 2003
R	Barun K. Mitra, *"Personality Development & Soft Skills*", First Edition; Oxford Publishers, 2011
R	ICT Academy of Kerala, "*Life Skills for Engineers*", McGraw Hill Education (India) Private Ltd., 2016
R	Caruso, D. R. and Salovey P, "*The Emotionally Intelligent Manager: How to Develop and Use the Four Key Emotional Skills of Leadership*", John Wiley & Sons, 2004
R	Kalyana, "*Soft Skill for Managers*"; First Edition; Wiley Publishing Ltd., 2015
R	Larry James , "*The First Book of Life Skills*"; First Edition; Embassy Books, 2016
R	Shalini Verma, *"Development of Life Skills and Professional Practice"*; First Edition; Sultan Chand (G/L) & Company, 2014
R	Daniel Goleman, "*Emotional Intelligence*"; Bantam, 2006
R	Remesh S., Vishnu R.G., "*Life Skills for Engineers*", Ridhima Publications, First Edition, 2016
R	Jeff Butterfield, "*Soft Skills for Everyone*", Cengage Learning India Pvt Ltd; 1 edition, 2011
R	Stephen P. Robbins, Phillip L. Hunsaker*, "Training in Interpersonal Skills: Tips for Managing People at Work"*, Pearson Education, India; 6 edition, 2015
R	Gopalaswamy Ramesh, Mahadevan Ramesh*, "The Ace of Soft Skills: Attitude, Communication and Etiquette for Success"*, Pearson Education; 1 edition, 2013

COURSE PREREQUISITES : NIL

COURSE OBJECTIVES:

1	Enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success
2	Help the students acquire the skills needed to apply the principles of personal and professional success in their lives and careers

COURSE OUTCOMES:

NO	DESCRIPTION
CO1	Define and identify different life skills required in personal and professional life
CO2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress
CO3	Explain the basic mechanics of effective communication and demonstrate these through presentations
CO4	Take part in group discussions
CO5	Use appropriate thinking and problem-solving techniques to solve new problems
CO6	Understand the basics of teamwork and leadership

MAPPING OF COURSE OUTCOMES TO PROGRAMME OUTCOMES:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1						2		1	2	2	1	3
CO 2									3			2
CO 3						1			1	3		
CO 4										3		1
CO 5		3	2	1								
CO 6						1			3			

JUSTIFICATION:

CO	PO	JUSTIFICATION
CO 1	PO6	Knowledge and mastery of life skills will enable the student to effectively function at both the professional and personal levels
	PO8	The skills of analysis, logical reasoning and problem-solving will enable the student to make the right decision when faced with moral dilemmas in personal and professional life
	PO9	Developing an awareness of the self, learning to work in groups and teams, and learning about leadership enables the student to effectively carry out his responsibilities at both the individual and team level
	PO10	Developing an understanding of oneself, and learning the tools of effective communication enables the student to become a successful communicator
	PO11	Learning about problem-solving and decision making, and individual and team work enables the student to become efficient leaders and managers
	PO12	Understanding the importance of engaging in continuous personal and professional development motivates the student to become a lifelong learner
CO 2	PO9	Gaining an insight into the self and learning to cope with emotions and stress will help the student to be more effective at the individual level and as a team player
	PO12	Understanding one's priorities and learning to set clear goals will motivate the student to engage in lifelong learning
CO 3	PO6	Learning about and practising effective communication strategies will make the student successful in interacting with others in both professional and personal life
	PO9	Effective communication strategies will help the student to be more successful at the individual level and in groups: as a leader and as a team player
	PO10	Mastering the theoretical and practical aspects of communication will lay the foundation for effective personal and professional communication
CO 4	PO10	Taking part in group discussions and developing the skills of listening and responding to others' opinions helps the student to learn the rudiments of effective group communication
	PO12	By engaging in group discussions on contemporary topics the student will realize the need to keep oneself abreast of current developments thereby engaging in lifelong learning

CO 5	PO2	The exposure to effective thinking and problem-solving techniques enables the student to learn the rudiments of problem analysis
	PO3	Having gained an insight into creative and critical thinking techniques, the student will be better equipped to design and develop solutions
	PO4	The student will learn how to apply logical and creative thinking as the situation demands while encountering complex problems
CO 6	PO6	Learning about teamwork and leadership will help the student in both professional and personal life
	PO9	The theoretical framework and practical exposure provided will enhance the efficiency of the student in individual and team contexts

GAPS/TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

	TOPICS	**PROPOSED ACTION**
1	Existential, Teaching/Pedagogical, Moral Intelligences	Lecture/Activity
2	Polya's Problem Solving Method	Lecture/Activity
3	Multicultural awareness	Lecture/Presentation/Activity
4	Benjamin Franklin's List of Virtues	Lecture/Activity
5	Social Skills	Presentation/Activity
6	Current Affairs	Activity
7	Industrial Knowledge	Presentation
8	Gender Sensitivity	Presentation/Activity

WEB SOURCE REFERENCES:

1	https://swayam.gov.in/nd2_cec19_hs05/ - Swayam – Developing Life Skills
2	https://www.skillsyouneed.com/general/life-skills.html
3	https://ethicsunwrapped.utexas.edu/
4	Stress management strategies: Ways to Unwind - https://www.youtube.com/watch?v=0fL-pn80s-c
5	Signs of Stress https://www.youtube.com/watch?v=n3G0n7HoTr4
6	What is Civic Virtue? - YouTube https://www.youtube.com › watch?v=ANl4MqtHBxg
7	What Is Six Thinking Hats? - YouTube https://www.youtube.com › watch?v=UZ8vF8HRWE4
8	https://www.verywellmind.com/gardners-theory-of-multiple-intelligences-2795161
9	https://www.youtube.com/watch?v=IHMv6ALNfcs (Levels of Leadership)
10	https://www.youtube.com/watch?v=j6FSaHVufZc (Styles of Leadership)
11	https://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/stress-relief/art-20044476
12	https://www.mhanational.org/helpful-vs-harmful-ways-manage-emotions
13	https://www.inc.com/justin-bariso/7-simple-strategies-that-will-help-you-manage-your-emotions.html
14	https://nickwignall.com/self-awareness/

15	http://www.debonogroup.com/six_thinking_hats.php
16	https://www.youtube.com/watch?v=UZ8vF8HRWE4
17	https://icebreakerideas.com/problem-solving-activities/
18	https://www.verywellmind.com/left-brain-vs-right-brain-2795005
19	https://ideadrop.co/creative-vs-strategic-thinking-whats-difference/
20	https://www.youtube.com/watch?v=bEusrD8g-dM
21	https://activecollab.com/blog/collaboration/group-vs-team
22	https://www.youtube.com/watch?v=uG-FLOi4OOU
23	https://www.managementstudyguide.com/virtual-team.htm
24	https://www.youtube.com/watch?v=AcxeMU0I1b4
25	https://www.forbes.com/sites/deeppatel/2017/03/22/11-powerful-traits-of-successful-leaders/
26	https://www.youtube.com/watch?v=eG16EmA2Fe0
27	https://www.investopedia.com/terms/l/leadership-grid.asp
28	https://www.inc.com/peter-economy/44-inspiring-john-c-maxwell-quotes-that-will-take-you-to-leadership-success.html
29	http://psychologyformarketers.com/5-levels-leadership-john-maxwell/

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

√CHALK & TALK	**√STUD. ASSIGNMENT**	**√WEB RESOURCES**	
LCD/SMART BOARDS	**√STUD. SEMINARS**	ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

√ASSIGNMENTS	**√STUD. SEMINARS**	**√TESTS/MODEL EXAMS**	**√UNIV. EXAMINATION**
STUD. LAB PRACTICES	STUD. VIVA	MINI/MAJOR PROJECTS	CERTIFICATIONS
ADD-ON COURSES	OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

√ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	**√STUDENT FEEDBACK ON FACULTY (TWICE)**
ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	OTHERS

100908/PH922S	ENGINEERING PHYSICS LAB	CATEGORY	L	T	P	CREDIT	YEAR OF INTRODUCTION
		BSC	0	0	2	1	2020

COURSE INFORMATION SHEET- ENGINEERING PHYSICS

PROGRAMME: ENGINEERING	DEGREE: BTECH
COURSE: ENGINEERING PHYSICS LAB	SEMESTER: 1 AND 2 CREDITS: 1
COURSE CODE: 100908/PH922S REGULATION: 2020	COURSE TYPE: CORE
COURSE AREA/DOMAIN: Engineering Physics	CONTACT HOURS: 2 hours/Week.
CORRESPONDING THEORY COURSE CODE :100902/PH900B , 100906/PH900B	LAB COURSE NAME: Engineering Physics Lab

Preamble: The aim of this course is to make the students gain practical knowledge to correlate with the theoretical studies and to develop practical applications of engineering materials and use the principle in the right way to implement the modern technology.

Prerequisite: Higher secondary level Physics

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

CO1	Develop analytical/experimental skills and impart prerequisite hands-on experience for engineering laboratories
CO2	Understand the need for precise measurement practices for data recording
CO3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
CO4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
CO5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the result

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3				2			1	2			1
CO 2	3				2			1	2			1
CO 3	3				2			1	2			1
CO 4	3				2			1	2			1
CO 5	3				2			1	2			1

Justification:

CO1.PO1	Develop analytical/experimental skills and impart prerequisite hands-on experience for engineering laboratories
CO1.PO5	Review research literature to answer open questions assessed by viva
CO1.PO8	Professional punctuality and understanding professional ethics by self-reading posters
CO1.PO9	Effectively function individually and as a team in the laboratory
CO1.PO12	Capture the current and relevant innovations in the respective branch

CO2.PO1	Understand the need for precise measurement practices for data recording
CO2.PO5	Review research literature to answer open questions assessed by viva
CO2.PO8	Professional punctuality and understanding professional ethics by self-reading posters
CO2.PO9	Effectively function individually and as a team in the laboratory
CO2.PO12	Capture the current and relevant innovations in the respective branch

CO3.PO1	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
CO3.PO5	Review research literature to answer open questions assessed by viva
CO3.PO8	Professional punctuality and understanding professional ethics by self-reading posters
CO3.PO9	Effectively function individually and as a team in the laboratory
CO3.PO12	Capture the current and relevant innovations in the respective branch

CO4.PO1	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
CO4.PO5	Review research literature to answer open questions assessed by viva
CO4.PO8	Professional punctuality and understanding professional ethics by self-reading posters
CO4.PO9	Effectively function individually and as a team in the laboratory
CO4.PO12	Capture the current and relevant innovations in the respective branch

CO5.PO1	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results
CO5.PO5	Review research literature to answer open questions assessed by viva
CO5.PO8	Professional punctuality and understanding professional ethics by self-reading posters

CO5.PO9	Effectively function individually and as a team in the laboratory
CO5.PO12	Capture the current and relevant innovations in the respective branch

WEB SOURCE REFERENCES:

1	http://www.animations.physics.unsw.edu.au/jw/oscillations.htm
2	http://www.itp.uni-hannover.de/~zawischa/ITP/diffraction.html
3	http://science.howstuffworks.com/environmental/energy/superconductivity.htm
4	http://plato.stanford.edu/entries/qm/
5	http://www.damtp.cam.ac.uk/user/tong/statphys.html
6	http://www.coherent.com/products/?834/Lasers

Mark distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration (Internal)
100	100	-	1 hour

Continuous Internal Evaluation Pattern:

Attendance : 20marks
Class work/Assessment/Viva-voce : 50marks
End semester examination : 30marks

End Semester Examination Pattern: Written Objective Examination of one hour

SYLLABUS

LIST OF EXPERIMENTS

(Minimum8experimentsshouldbecompleted)

1. CRO-Measurement of frequency and amplitude of waveforms
2. Measurement of strain using strain gauge and wheat stones bridge
3. LCR Circuit – Forced and damped harmonic oscillations
4. Melde'sstringapparatus-Measurementoffrequencyinthetransverseandlongitudinalmode
5. WavelengthmeasurementofamonochromaticsourceoflightusingNewton'sRingsmethod.
6. Determination of diameter of a thin wire or thickness of a thin strip of paper using air wedge method.
7. To measure the wavelength using a millimeter scale as a grating

8. Measurement of wavelength of a source of light using grating.
9. Determinationofdispersivepowerandresolvingpowerofaplanetransmissiongrating
10. Determination of the particle size of lycopodium powder
11. DeterminationofthewavelengthofHe-Nelaseroranystandardlaserusingdiffractiongrating
12. Calculatethenumericalaperture andstudythelossesthatoccurinopticalfibercable.
13. I-V characteristics of solar cell.
14. LED Characteristics.
15. UltrasonicDiffractometer-Wavelengthandvelocitymeasurementofultrasonicwavesinaliquid
16. Deflection magnetometer-Moment of a magnet- Tan A position.

Reference books

1. S.L.Gupta and Dr.V.Kumar, "Practical physics with viva voice", Pragati PrakashanPublishers, Revised Edition,2009
2. M.N.Avadhanulu,A.A.DaniandPokelyP.M,"ExperimentsinEngineeringPhysics",S.Chand&Co,2008
3. S. K. Gupta, "Engineering physics practicals", Krishna Prakashan Pvt. Ltd.,2014
4. P. R. Sasikumar "Practical Physics", PHI Ltd.,2011.

ASSESSMENT METHODOLOGIES-DIRECT

☐ **ASSIGNMENTS**	☐ **STUD. SEMINARS**	☐ **TESTS/MODEL EXAMS**	✔ **UNIV. EXAMINATION (Conducted Internally)**
✔ **STUD. LAB PRACTICES**	✔ **STUD. VIVA**	☐ **MINI/MAJOR PROJECTS**	☐ **CERTIFICATIONS**
☐ **ADD-ON COURSES**	☐ **OTHERS**	☐ **POSTER PRESENTATIONS**	

ASSESSMENT METHODOLOGIES-INDIRECT

✔ **ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)**	✔ **STUDENT FEEDBACK ON FACULTY (TWICE)**
☐ **ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS**	☐ **OTHERS**

Prepared by **Approved by**

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JOSE ANTONY V J
RINKU JACOB
DEEPTHI JAYAN K
SUJITH S **(HOD)**

COURSE INFORMATION SHEET

ELECTRICAL WORKSHOP

PROGRAMME: **CE**	DEGREE: **BTECH**
COURSE: **Electrical Workshop**	SEMESTER: **S1** CREDITS: **1**
COURSE CODE: **100908/CO922U** REGULATION: 2020 **UG**	COURSE TYPE: **LAB**
COURSE AREA/DOMAIN: **ELECTRICAL WORKSHOP**	CONTACT HOURS: **1 hour/Week.**
CORRESPONDING LAB COURSE CODE (IF ANY): **NIL**	LAB COURSE NAME: **NIL**

SYLLABUS:

UNIT	DETAILS	HOURS
I	Demonstrate the precautionary steps adopted in case of Electrical shocks	2
	Identify different types of cables and wires	2
	Identify different types of switches, fuses, fuse carriers, MCB, ELCB and MCCB with ratings	2
II	Wiring of simple light circuit for controlling light/ fan point. (PVC conduit wiring)	2
III	Wiring of light/fan circuit using Two way switches. (Staircase wiring)	2
IV	Wiring of Fluorescent lamps and light sockets (6A) with a power circuit for controlling power device. (16A socket)	2
V	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and Energy meter.	2
VI	Identify different types of batteries with their specifications.	2
	Demonstrate the Pipe and Plate Earthing Schemes using Charts/Site Visit.	2
	TOTAL HOURS	24

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
R	Uppal S.L (2003) Electrical Wiring, Estimating and Costing, Khanna Publishers, Delhi.
T	Dhogal P S Basic Electrical Engineering I Tata Mc Grow Hill 2011
R	Singh R P. Electrical Workshop Safety, Commissioning, Maintenance and testing of electrical equipments I K International (P) Ltd 2013
R	Anwani M.L ,Basic Wireman (Wiring, Estimating and Costing), Dhanpat Rai Publications (P) Ltd
T	Edward Hughes(Sept.2010), Electrical & Electronics Technology,(10th ed.), Pearson Education India Ltd
R	Punmia B C(2005), Surveying Vol.1, (16thed), Laxmi Publications, New Delhi
T	T P Kanetkar and S V Kulkarni (1985), Surveying and Levelling, Part II,(23RDed), Pune Vidarthi Griha Prakashan, Pune

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
-	Fundamental Physics (Grade XI & XII)	The course gives the students a general understanding of basic electrical and electronic circuits	-

-	Basic Mathematics	The course gives the students a general understanding of basic mathematical calculations and problems	-

COURSE OBJECTIVES:

1	Electrical Workshop is intended to impart skills to plan and carry out simple electrical wiring. It is essential for the practicing engineers to identify the basic practices and safety measures in electrical wiring.

COURSE OUTCOMES:

Sl. No.	DESCRIPTION	BLOOMS' TAXONOMY LEVEL
1	Demonstrate safety measures against electric shocks.	Knowledge [Level 1]
2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols	Comprehension [Level 2]
3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings	Application [Level 3]

MAPPING COURSE OUTCOMES (COs) – PROGRAM OUTCOMES (POs) AND COURSE OUTCOMES (COs) – PROGRAM SPECIFIC OUTCOMES (PSOs)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1						3						1			
CO2	2									1					
CO3	2			1		1		1	2	2		2			
ESL 130	**2**			**1**		**2**		**1**	**1**	**2**		**2**			

JUSTIFATIONS FOR CO-PO MAPPING

Mapping	L/H/M	Justification
CO1-PO6	H	Student will be able to develop wiring arrangements that meets the specific needs with due consideration of the electrical safety aspects.
CO1-PO12	L	Student will get an initiation to explore various protective measures
CO2-PO1	M	Student will be able apply the knowledge about types of wires, cables & other accessories to propose innovative solutions in the area of domestic wiring
CO2-PO10	L	Students will be able to suggest appropriate back up supply based on the specific application
CO3-PO1	M	Student will be able to design wiring systems for domestic buildings applying the knowledge engineering fundamentals
CO3-PO4	L	Student will be able to analyze and solve the problems related to light and power circuits.
CO3-PO6	L	Students will be able to prepare estimate of wiring circuits considering the economic aspects
CO3-PO8	L	Will help the student for the better understading of ethical principles and responsibilities in the area of energy conservation.
CO3-PO9	M	Students will conduct the experiments in groups thereby improving their ability to work as a team
CO3-PO10	M	Student will be able to identify and formulate engineering problems in wiring

CO3-PO12	M	Student will be able understand the need of energy conservation for sustainable development

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

Sl. No.	DESCRIPTION	Proposed Action	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Study of wiring tools and accessories	Familiarization of tools and accessories	PO1,PO3	-

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

Sl. No.	DESCRIPTION	Proposed Action	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Hospital Wiring	Familiarization of Hospital Wiring	PO2,PO3,PO12	PSO1,PSO2

WEB SOURCE REFERENCES:

1	Bell & Gossett, Basic Wiring [Online], Available: http://www.gobookee.net/basic-home-electrical-wiring-diagrams/
2	Engineering Surveying [Online], Available: http://www. Isgi.polyu.edu.hk/geomatics/article/

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☑ CHALK & TALK	☐ STUD. ASSIGNMENT	☑ WEB RESOURCES	
☑LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

☐ ASSIGNMENTS	☐ STUD. SEMINARS	☑ TESTS/MODEL EXAMS	☐ UNIV. EXAMINATION
☑ STUD. LAB PRACTICES	☑ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

☑ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☑ STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

COURSE INFORMATION SHEET

ELECTRONICS WORKSHOP

PROGRAMME: Civil Engineering	DEGREE: B.Tech
COURSE: ELECTRONICS ENGINEERING WORKSHOP	SEMESTER: 1 CREDITS: 1
COURSE CODE: 100908/CO922U REGULATION: 2019 (Autonomous)	COURSE TYPE: CORE
COURSE AREA/DOMAIN: INTRODUCTION TO ELECTRONICS ENGINEERING	CONTACT HOURS: 1hours /Week.
CORRESPONDING THEORY COURSE CODE (IF ANY): EST 130	THEORY COURSE NAME: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

SYLLABUS (PART II):

UNIT	DETAILS	HOURS
1.	Familiarization/Identification of electronic components with specification (Functionality, type, size, colour coding, package, symbol, cost etc. [Active, Passive, Electrical, Electronic, Electro-mechanical, Wires, Cables, Connectors, Fuses, Switches, Relays, Crystals, Displays, Fasteners, Heat sink etc.)	4
2.	Drawing of electronic circuit diagrams using BIS/IEEE symbols and introduction to EDA tools (such as Dia or XCircuit), Interpret data sheets of discrete components and IC's, Estimation and costing.	2
3.	Familiarization/Application of testing instruments and commonly used tools. [Multimeter, Function generator, Power supply, DSO etc.] [Soldering iron, De- soldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and de-soldering station etc.]	2
5.	Testing of electronic components [Resistor, Capacitor, Diode, Transistor and JFET using multimeter]	2
6.	Inter-connection methods and soldering practice. [Bread board, Wrapping, Crimping, Soldering - types - selection of materials and safety precautions, soldering practice in connectors and general purpose PCB, Crimping.]	2
7.	Printed circuit boards (PCB) [Types, Single sided, Double sided, PTH, Processing methods, Design and fabrication of a single sided PCB for a	2

	simple circuit with manual etching (Ferric chloride) and drilling.]	
8.	Assembling of electronic circuits using SMT (Surface Mount Technology) stations.	2
9.	Assembling of electronic circuit/system on general purpose PCB, test and show the functioning (Any Two circuits).	2
	TOTAL HOURS	18

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
1.	Electronic Devices and Circuits/Bell. D. A/Oxford University Press
2.	Electronic Devices and Circuit Theory/Boylested, R.L Nashelsky/Pearson Education
3.	Basic Electronic Devices, Circuits and Fundamentals/Kal. S/PHI Learning
5.	Electronics Circuit Analysis and Design/ Neeman D.A/ Tata McGraw Hill
6.	Microelectronic Circuits/Sedra A S and Smith K C/Oxford University Press

COURSE PRE-REQUISITES: XII PHYSICS

COURSE OBJECTIVES:

1.	To enable the students to identify various electronic components and equipment
2.	To enable the students to assemble and test various electronic circuits

COURSE OUTCOMES:

SL. NO.	DESCRIPTION	BLOOM'S TAXONOMY LEVEL
1.	Graduates will be able to identify various electronic components like resistors, capacitors, diodes, transistors, etc.	Knowledge and Understanding (Level 1 and Level 2)
2.	Graduates will be able to use measuring instruments like multimeter and equipments such as function generator, power supply and DSO.	Knowledge, Understand and Apply (Level 1, Level 2 and Level 3)
3.	Graduates will be able to assemble different circuits on breadboard	Create and Analyze (Level 6 and Level 4)
4.	Graduates will get familiarized with software tools for drawing circuits	Knowledge, Understand and Apply (Level 1, Level 2 and Level 3)
5.	Graduates develop soldering and de-soldering skills useful in electronic circuit interconnections	Create (Level 6)

CO-PO-PSO MAPPING:

	Programme Outcomes (POs)												Programme-specific Outcomes (PSOs)		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO 2	2	-	-	-	2	-	-	-	-	-	-	2	2	-	-
CO 3	2	2	-	-		-	-	-	3	-	-	-	2	-	2
CO 4	2	-	-	-	2	-	-	-	3	-	-	3	-	-	1
CO 5	3	-	-	-	-	-	-	-	3	-	-	2	-	-	2

JUSTIFICATION FOR CO-PO-PSO CORRELATION:

	PO1	PO2	PO5	PO9	PO12	PSO1	PSO3
CO1	Application of knowledge of basic passive and active components					Understand the fundamentals of passive and active components	
CO2	Application of engineering skills in using different equipments in electronics workshop				Team work can be a mandate for life-long learning	Knowledge and application of various fundamental laws in electronics, understand the operation of various testing equipment	

CO 3	Application of knowledge of breadboard, function generator and DSO to assemble	Usage of DSO and other testing instruments are involved in analyzing and testing circuits			Motivate the students to further explore their knowledge in conducting independent experiments	Exposure to circuit connections and troubleshooting which help them in future	Working in a team to assemble, troubleshoot helps exhibit leadership qualities
CO4	The familiarization of software tools for drawing circuits.		Carrying out experiments require coordinating as a group	Interpersonal skills can be improved by working together as a team	Working as groups motivates the students to further explore their knowledge		Learning new techniques to adapt to changes in industry
CO5	Develop soldering and de-soldering skills useful in electronic circuit interconnections.						Working in a team helps exhibit leadership qualities and adapt to changes in industry

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SNO	DESCRIPTION	PROPOSED ACTIONS
1	Nil	(N. A.)

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

1.	Hobby circuits to practice

WEB SOURCE REFERENCES:

1	*https://nptel.ac.in/courses/117103063/*
2	*http://opencircuitdesign.com/xcircuit/*
3	*www.electronics-tutorials.ws*
4	*https://www.pcbway.com/blog/Engineering_Technical/Analysis_of_the_Methods_of_PCB_Interconnection.html*
5	*https://www.electronics-notes.com/articles/electronic_components/*

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☐ CHALK & TALK	☐ ~~STUD. ASSIGNMENT~~	☐ WEB RESOURCES	
☐ LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

☐ ~~ASSIGNMENTS~~	☐ ~~STUD. SEMINARS~~	☐ TESTS/MODEL EXAMS	☐ ~~UNIV. EXAMINATION~~
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ ~~MINI/MAJOR PROJECTS~~	☐ ~~CERTIFICATIONS~~
☐ ~~ADD-ON COURSES~~	☐ ~~OTHERS~~		

ASSESSMENT METHODOLOGIES-INDIRECT

☐ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☐ STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ~~ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS~~	☐ ~~OTHERS~~