List of Revised Courses

Department : *Civil Engineering*

Program Name : *B.Tech.*

Academic Year : 2018-19

List of Revised Courses

Sr. No.	Course Code	Name of the Course
01.	CE01TBS01	MATHEMATICS-II
02.	CE01TBS02	CHEMISTRY
03.	CE01TES01	PROGRAMMING FOR PROBLEM SOLVING
04.	CE01TES02	ENGINEERING MECHANICS
05.	CE02TBS03	PHYSICS
06.	CE02TES03	BASIC ELECTRICAL ENGINEERING
07.	CE02TBS04	MATHEMATICS-I
08.	CE02THS01	ENGLISH
09.	CE02PES05	ENGINEERING GRAPHICS & DESIGN

Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2018-19

School : *School of Studies of Engineering and Technology*

Department : *Civil Engineering*

Date and Time : *September 10, 2018 12:00 noon*

Venue : *Office chamber of the HOD, Civil Engg.*

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
DEPARTMENT OF CIVIL ENGINEERING, SCHOOL OF STUDIES, ENGG. & TECH.

MINUTES OF MEETING

A Meeting of Board of Studies, (Notified vide letter No.225/ Civil/ E&T/ GGV/ 2018, Bilaspur Dated-05.09.2018.) of the Department of Civil Engg. SoS Engg. & Tech., GGV has been held today on 10th September 2018, at 12.00 noon in the office chamber of the HOD, Civil Engg. Following members were present in the meeting.

1	Dr. M. Chakradhara Rao	Asso. Professor & Head, CED, SoS E & T, Chairman, BOS
2	Dr. Shailendra Kumar	Registrar (Acting), Professor, CED, SoS E & T, Member, BOS
3	Shri R.V. Anand	Project Director, IRCON International Ltd., Bilaspur (C.G). Industry Expert – Member, BOS
4	Mr. Nikhil Kumar Verma	Asst. Professor, CED, SoS E & T, Member, BOS
5	Prof. U. K. Dewangan	Prof. & Head, CED, NIT, Raipur, Subject Expert - Member, BOS, could not attend the meeting due to his pre-occupied assignment at NIT, Raipur. However, he has sent his remarks through mail. (copy attached)

In meeting the following was discussed:

1. The members discussed the scheme and detailed syllabi, proposed for the B. Tech. Ist year Civil Engg. (Ist to IInd Semesters), wef. Session 2018-19 as per choice based credit system (CBCS, AICTE).
2. The member also discussed the detailed syllabi of Paper-I and Paper-II proposed for the VRET-2018 for Civil Engg.

After discussion and deliberation, the following was resolved and recommended:-

1. The members recommended and approved the Course scheme and syllabi (Copy attached) for B. Tech. Ist year Civil Engg. (Ist to IInd Semesters) to be effective from session 2018-19 and onwards.
2. The members also resolved that as the supervisors available in the department are from Structural Engineering specialization, the proposed syllabus of Paper-II which contains mainly the structural Engineering and Mathematics along with Paper-I (Research Methodology) is approved and recommended for VRET-2018 for Civil Engg. However in future if any supervisor who belongs to other than the Structural Engg. specialization are available in the department, then the Paper-II syllabus for VRET (Civil Engg.) will be modified accordingly.

10/9/18
Dr. M. Chakradhara Rao

10.9.18
Prof. Shailendra Kumar

10/9/2018
Shri R.V. Anand

10/09/18
Mr. Nikhil Kumar Verma

The following revesions were introduced in the of B. Tech. 1ST year Civil Engg. (I to II semesters) scheme and syllabi :

- MATHEMATICS-II (CE01TBS01)
- CHEMISTRY (CE01TBS02)
- PROGRAMMING FOR PROBLEM SOLVING (CE01TES01)
- ENGINEERING MECHANICS (CE01TES02)
- PHYSICS (CE02TBS03)
- BASIC ELECTRICAL ENGINEERING (CE02TES03)
- MATHEMATICS-I (CE02TBS04)
- ENGLISH (CE02THS01)
- ENGINEERING GRAPHICS & DESIGN (CE02PES05)

The following new courses were introduced in the of B. Tech. 1ST year Civil Engg. (I to II semesters) scheme and syllabi :

- PROGRAMMING FOR PROBLEM SOLVING LAB (CE01PES01)
- ENVIRONMENTAL SCIENCES (CE02THS02)

विभागाध्यक्ष
HOD
सिविल इंजीनियरी विभाग
Department of Civil Engineering
प्रौ.सं.गु.घा.विश्वविद्यालय, बिलासपुर (छ.ग.)
I.T., G.G.V. Bilaspur (C.G.)

Signature & Seal of HoD

Scheme and Syllabus

CIVIL ENGINEERING DEPARTMENT, SOS, ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA (A CENTRAL UNIVERSITY), BILASPUR

SCHEME OF B.TECH. I SEMESTER (COURSE-B) CIVIL ENGINEERING
W.E.F. 2018-19 (ODD SEMESTER)

S. No	Subject Code	Subjects	Period/Week			Scheme of Evaluation				Grand Total	Credits
						Internal Assessment (IA)			ESE		
		Theory	L	T	P	CT-I	CT-II	Total			
1	CE01TBS01	MATHEMATICS-II	3	1	0	15	15	30	70	100	4
2	CE01TBS02	CHEMISTRY	3	1	0	15	15	30	70	100	4
3	CE01TES01	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	15	15	30	70	100	3
4	CE01TES02	ENGINEERING MECHANICS	3	0	0	15	15	30	70	100	3
		Practical									
1	CE01PBS01	CHEMISTRY LAB	0	0	3	-	-	30	20	50	1.5
2	CE01PES01	PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	-	-	30	20	50	1.5
3	CE01PES02	WORKSHOP & MANUFACTURING PRACTICES	1	0	3	-	-	30	20	50	2.5
4	CE01PES03	ENGINEERING MECHANICS LAB	0	0	2			30	20	50	1
		INDUCTION TRANNING PROGRAMME*	-	-	-	-	-	-	-	-	-
										Total Credits	20.5

L - Lecture Hours, T-Tutorial Hours, P - Practical Hours, CT - Class Test, ESE – End Semester Exam;
*** Mandatory Training Programme**

SCHEME OF B.TECH. II SEMESTER (COURSE-A) CIVIL ENGINEERING
W.E.F. 2018-19 (EVEN SEMESTER)

S. No	Subject Code	Subjects	Period/Week			Scheme of Evaluation				Grand Total	Credits
						Internal Assessment (IA)			ESE		
		Theory	L	T	P	CT-I	CT-II	Total			
1	CE02TBS03	PHYSICS	3	1	0	15	15	30	70	100	4
2	CE02TES03	BASIC ELECTRICAL ENGINEERING	3	1	0	15	15	30	70	100	4
3	CE02TBS04	MATHEMATICS-I	3	0	0	15	15	30	70	100	4
4	CE02THS01	ENGLISH	3	0	0	15	15	30	70	100	3
5	CE02THS02	ENVIRONMENTAL SCIENCES	3	0	0	-	-	-	-	-	0
		Practical									
1	CE02PBS02	PHYSICS LAB	0	0	3	-	-	30	20	50	1.5
2	CE02PES04	BASIC ELECTRICAL ENGINEERING LABORATORY	0	0	2	-	-	30	20	50	1
3	CE02PES05	ENGINEERING GRAPHICS & DESIGN	1	0	3	-	-	30	20	50	2.5
										Total Credits	20

L - Lecture Hours, T-Tutorial Hours, P - Practical Hours, CT - Class Test, ESE – End Semester Exam; * Mandatory Course

SYLLAUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE01TBS01	L	T	P	CT-1	CT-II	TOTAL	70	100	4
Subject:	MATHEMATICS-II	3	1	0	15	15	30			

Course Content:

Module 1: First order ordinary differential equations (6 hours): Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Module 2: Ordinary differential equations of higher orders (Prerequisite 2c, 4a) (8 hours) second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Module 3: Partial Differential Equations – First order (Prerequisite 5a-b) (6 hours): First order partial differential equations, solutions of first order linear and non-linear PDEs.

Module 4: Partial Differential Equations– Higher order(Prerequisite 5b-c) (10 hours) Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method. Flows, vibrations and diffusions, second-order linear equations and their classification, Initial and boundary conditions (with an informal description of well-posed problems), D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables. Boundary-value problems: Solution of boundary-value problems for various linear PDEs in various geometries.

Textbooks/References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &Sons, 2006.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
6. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
7. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993.
8. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall, 1998.
9. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
10. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010
11.Denian murry,defferential equations ,oxford publications

.

SYLLAUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE01TBS02	L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject:	CHEMISTRY	3	1	0	15	15	30			

Course Learning Objectives:

The objective of this Course is to:

- To make aware and enrich the the students about the basic concept and understanding of chemical concepts of basic Chemistry and spectroscopic techniques.

Course Content:

UNIT-1: I Concept of Quantum Energy and Spectroscopy: Quantization of Energy, Regions of spectrum. Electronic Spectroscopy: Electronic Transition, Woodward Fiesher rules for calculating λ_{max} of conjugated dienes & α, β-unsaturated carbonyl compound, various shifts in λ_{max} and intensities. Infra-Red Spectroscopy: Conditions for Infra-Red Spectroscopy, Molecular vibrations & factors affecting Infra-Red frequencies.

UNIT-2: Chemical Bonding in Molecules: Introduction of chemical bonding, VSEPER Theory, V.B.Theory and Molecular Orbital Theory. Energy level diagrams of diatomic molecules and ions.

UNIT-3: Concept of Chirality, Enentiomers, Diastereomers,Meso-compounds and Recimic mixtures. Conformation of Acyclic hydrocarbons (Ethane, Propane & n-Butane) and cyclic hydrocarbon (Cyclohexane), Plane of symmetry, Centre of symmetry, Absolute and Relative Configuration (R &S, D & L and E & Z).

UNIT -4: Reactivity of Organic Molecules, Factors influencing acidity, basicity and nucleophilicity of molecules, kinetic vs thermodynamic control of reactions.

UNIT -5: Strategy for Synthesis of Organic Compounds: Reaction intermediates: Stability of Free Radicle, Carbocation and Carbanion. Introduction to reaction involving Addition, Elimination, Substitution and Ring opening and Cyclization.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.
3. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
4. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
5. A textbook of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
6. Applied Chemistry by H.D. Gesser, Springer Publishers
7. Textbook of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM
8. B. Siva Shankar, "Engineering Chemistry", Tata Mc Graw Hill Publishing Limited, 3rd Edition, 2015.
9. S. S. Dara, Mukkanti, "Text of Engineering Chemistry", S. Chand & Co, New Delhi, 12th Edition, 2006.
10. C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India, 5th Edition, 2013.

11. R. P. Mani, K. N. Mishra, "Chemistry of Engineering Materials", Cengage Learning, 3rd Edition, 2015.

Course Outcomes- At the end of the course the students will be able to understand and solve the practical problems of their higher Engineering classes on the basis of understanding of Chemistry developed in their B. Tech. I sem classes.

SYLLAUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE02TES01	L	T	P	CT-1	CT-II	TOTAL	70	100	03
Subject:	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	15	15	30			

Course Learning Objectives:

- To understand the basic of Idea of Algorithm.
- To understand the programing concept of Arithmetic expressions and Basic Algorithms
- To learn the Functions and Structure of array.

Course Content:

UNIT-1: Introduction to Programming (3 lectures)
Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) -
Idea of Algorithm (3 lectures): steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.
From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

UNIT-2: **Arithmetic expressions and precedence (12 lectures)**
Conditional Branching and Loops
Writing and evaluation of conditionals and consequent branching
Iteration and loops
Arrays (6 lectures) Arrays (1-D, 2-D), Character arrays and strings

UNIT-3: Basic Algorithms (6 lectures)
Searching ,concept of binary search etc , Basic Sorting Algorithms Bubble sort etc,Finding roots of equations, introduction of Algorithm complexity

UNIT-4: Function (5 lectures)
Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference binary search etc
Recursion functions (5 lectures) Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, etc.

UNIT -5: Structure (4 lectures)
Structures, Defining structures and Array of Structures
Pointers (3 lectures) Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Suggested Text Books
(i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
(ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Suggested Reference Books

Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India

Course Outcomes- At the end of the course students will be able to

- Develop the algorithm and programmes for various applications using Arithmetic expressions, arrays, pointers and Functions.

SYLLAUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE01TES02	L	T	P	CT-1	CT-II	TOTAL	70	100	03
Subject:	ENGINEERING MECHANICS	3	0	0	15	15	30			

Course Learning Objectives:

To learn about

- The concepts Force systems, free body diagrams, resultant of forces and equations of equilibrium, Supports and support reactions and calculation of Centroid
- The Concept of moment of inertia of plane figures, Laws and applications of friction
- The Analysis of the truss and determination of axial forces by Method of Joints
- Motion of a body and their relationships and application of D Alembert's principle in rectilinear and curvilinear motions

Course Content:

UNIT- 1: Introduction to Engineering Mechanics covering, Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems

UNIT-2: Friction covering, Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies.
Basic Structural Analysis covering, Equilibrium in three dimensions; Method of Sections; Method of Joints; Simple Trusses; Zero force members.

UNIT 3: Centroid and Centre of Gravity covering, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections.

UNIT-4: Virtual Work and Energy Method-Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency.
Review of particle dynamics- Rectilinear motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT-5: Introduction to Kinetics of Rigid Bodies covering, Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation;

Text/Reference Books:

1. Irving H. Shames (2006), Engineering Mechanics, 4th Edition, Prentice Hall

2. F. P. Beer and E. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill

3. Andy Ruina and Rudra Pratap (2011), Introduction to Statics and Dynamics, Oxford University Press

4. Shanes and Rao (2006), Engineering Mechanics, Pearson Education, 6. Hibler and Gupta (2010) ,Engineering Mechanics (Statics, Dynamics) by Pearson Education

5. Bansal R.K.(2010), A Text Book of Engineering Mechanics, Laxmi Publications

6. Khurmi R.S. (2010), Engineering Mechanics, S. Chand & Co.

7. Tayal A.K. (2010), Engineering Mechanics, Umesh Publications

Course Outcomes- On successful completion of teaching-learning and evaluation activities, a student would be able to

- Identify and analyse the problems by applying the fundamental principles of engineering mechanics and to proceed to research, design and development of the mechanical systems.
- Construct free body diagrams and use appropriate equilibrium equations, Calculate unknown forces in a plane by resolution of force and equilibrium equations
- Locate Centroid of composite figures and determine moment of plane figures
- Analyze the systems with friction
- Determine the axial forces in the members of determinate truss.
- Calculation of acceleration, velocity and displacement and forces
- Calculation of angular displacement, velocity and angular acceleration of rotational bodies

SYLLAUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE02TBS03	L	T	P	CT-I	CT-II	TOTAL	70	100	04
Subject:	PHYSICS	3	1	0	15	15	30			

Course Learning Objectives:

- To know the basic principles, effects and applications such as physical, optical parameters used for Engineering applications.
- To learn about various laws and applications of electromagnetic theory.
- To know the basic structure, working principles and applications of lasers and optical fibre communication.
- To know the basics of semiconductor physics, semiconductor materials and devices and its characterization for advance technological applications
- To familiarize the basis of quantum theory and to make students to solve the physical problems for advancement of the technology.

Course Content:

Unit-1: Optics: Interference and Diffraction

Introduction, Young's experiment theory of interference, Coherent and non-coherent sources, Fresnel's Bi-prism and Newton's ring experiment.
Diffraction of light, Fresnel and Fraunhofer's diffraction, diffraction due to plane diffraction grating.

Unit-2 Electromagnetic Theory

Coulomb's law electrostatics field and potential, electric flux, Gauss' law, Poisson's and Laplace's equation. Equation of continuity for charge conservation, Ampere's and Faraday's laws, Maxwell's Electromagnetic equations.

Unit-3 Laser and Fiber optics

Introduction, elementary idea of spontaneous and stimulated emission, active medium population inversion, Einstein's coefficients, Types of lasers and important applications of lasers.
Introduction to optical fibers, basic principles of optical fiber, critical angle numerical aperture, maximum acceptance angle, classification of optical fiber.

Unit-4 Semiconductor physics and Devices

Formation of energy in solids, Energy band gap of metals, insulators and semiconductors, classification of semiconductor: Intrinsic and Extrinsic semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, Electrical conductivity in conductors and semiconductors, working of P-N junction diodes and Bipolar junction transistor.

Unit-5 Introduction to Quantum Mechanics

Introduction to QuantumMechanics, photoelectric effect, Compton effect, wave-particle duality, uncertainty principle, wave function, De-Broglie waves, phase and Group velocity, Davisson and Germer experiment, Schrodinger wave equation, particle in a box (I-Dimentional)

Text Books and References

1. Applied physics-I and II By Navneet Gupta, Dhanpat Rai & Co.
2. Engg. Physics by S.K.Srivastava and R.A. Yadav, New Age Pub. New Delhi

3. Engg. Physics by Uma Mukherjee, Narosa Publication.
4. Engg. Physics by M.N. Avadhanulu, S. Chand Pub.
5. Electricity and Magnetism by Rangwala and Mahajan, Tata McGraw Hill. 1998
6. Concepts of Physics Part-II by H.C.Verma, BharatiBhawan (P&D), 1998
7. Modern physics by Beiser, McGraw Hill Inc. New York, Publication 1995
8. Modern physics by Mani and Mehta, East-West Press Pvt.Ltd.1998
9. Introduction to Electrodynamics, David Griffith
10. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc.(1995).
11. B.E.A. Saleh and M.C. Teich, Fundamentals of Photonics, John Wiley & Sons. Inc.2007).
12. S.M. Sze, Semiconductor Devices: physics and Technology, Wiley (2008)
13. Yariv and p.yeh, Photonics Optical Electronics in Modern Communications, Oxford University press, New York (2007)
14. P. Bhattacharya, Semiconductor Optoelectronic Devices, prentice Hall of India (1997)
15. Online course: "Semiconductor Optoelectronics" by M. R. Shenoy on NPTEL.
16. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak on NPTEL.

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

- Student's ability to understand the basic principles and applications of physical optics for physical parameters measurements such as length, thickness, aperture size etc.
- Student's will be able to design, characterized the lasers and optical fibres and their effective utilization in optical communications, imaging etc.
- Students demonstrate appropriate competence and working knowledge of laws of electromagnetic theory and semiconductor physics and devices for their advance applications

SYLLAUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE02TES03	L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject:	BASIC ELCETRICAL ENGINEERING	3	1	0	15	15	30			

Course Learning Objectives:

- To impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- To provide working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices.
- To explain the working principle, construction, applications of DC machines, AC machines & measuring instruments.
- To Highlight the importance of transformers in transmission and distribution of electric power.

Course Content:

Unit-1 : DC Circuits (8 hours)
Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

Unit - 2: AC Circuits (8 hours)
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.

Unit - 3: Transformers (6 hours)
Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Unit - 4: Electrical Machines (8 hours)
Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

Unit - 5: Power Converters (6 hours)
DC-DC buck and boost converters, duty ratio control. Single-phase and three-phase voltage source inverters; sinusoidal modulation.

Electrical Installations (6 hours)
Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Suggested Text / Reference Books
(i)D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
(ii)D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

(iii)L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
(iv)E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
(v)V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

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

- Predict the behaviour of any electrical and magnetic circuits.
- Formulate and solve complex AC, DC circuits.
- Identify the type of electrical machine used for that particular application.
- Realize the requirement of transformers in transmission and distribution of electric power and other applications.
- Understand the function on multi-disciplinary teams.

SYLLAUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE02TBS04	L	T	P	CT-I	CT-II	TOTAL	70	100	04
Subject:	MATHEMATICS-I	3	1	0	15	15	30			

Course Content

Calculus (Single Variable)

Unit I: ***(A) Calculus:***

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Asymptotes: definition, properties and problems.

(B) ***Calculus:***

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule; Maxima and minima.

Module 2c: *Sequences and series:* (Prerequisite 2b) (10 hours)

Convergence of sequence and series, tests for convergence, power series, and Taylor's series.Series for exponential, trigonometric and logarithmic functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Textbooks/References:

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

Multivariable Calculus

Unit-2: (A):*Multivariable Calculus (Differentiation):* Limit, continuity and partial derivatives, direct ional erivate ives, total erivate ive; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Unit-2(B): *Multivariable Calculus (Integration)*

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes by (double integration) Center of mass and Gravity (constant and variable densities). Theorems of Green, Gauss and Stokes, orthogonal curvilinear coordinates, Simpleapplications involving cubes, sphere and rectangular parallelepipeds.

Textbooks/References:

5. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition,

Pearson,Reprint, 2002.

2. Veerarajan T., Engineering Mathemat ics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11 Reprint, 2010.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition,2000.

Matrices and Linear Algebra

Unit – 3 (A): ***Matrices (in case vector spaces is not to be taught)*** (14 hours)

Algebra of matrices, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors;

Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms.

(B) Matrices (in case vector spaces is to be taught)

Matrices, vectors: addition and scalar multiplication, matrix multiplication; linear systems of Equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

Unit-5 (A): ***Vector spaces***

Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation,ranknullity theorem, composition of linear maps, Matrix associated with a linear map.

(B) Vector spaces

Eigenvalues, eigenvectors, symmetric, skew-symmetric, and orthogonal Matrices, eigenbases. Diagonalization; Inner product spaces, Gram-Schmidt orthogonalization.

Textbooks/References:

1. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
2. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.http://www.sandia.gov/policy/14g.pdf

SYLLAUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE02THS01	L	T	P	CT-1	CT-II	TOTAL	70	100	03
Subject:	ENGLISH	3	0	0	15	15	30			

Course Learning Objectives

- To build up word power, to brush up the knowledge of English grammar, to develop good writing and speaking skills in the students

Course Content:

1. Vocabulary Building
The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

2. Basic Writing Skills
Sentence Structures , Use of phrases and clauses in sentences , Importance of proper punctuation , Creating coherence , Organizing principles of paragraphs in documents , Techniques for writing precisely

3. Identifying Common Errors in Writing
3.1 Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

4. Nature and Style of sensible Writing
Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion.

5. Writing Practices
Comprehension, Précis Writing, Essay Writing.

6. Oral Communication (This unit involves interactive practice sessions in Language Lab)
   - Listening Comprehension
   - Pronunciation, Intonation, Stress and Rhythm
   - Common Everyday Situations: Conversations and Dialogues
   - Communication at Workplace
   - Interviews
   - Formal Presentations

Suggested Readings:
(i) Practical English Usage. Michael Swan. OUP. 1995.
(ii) Remedial English Grammar. F.T. Wood. Macmillan.2007
(iii)On Writing Well. William Zinsser. Harper Resource Book. 2001
(iv) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(v) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
(vi) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Outcome: At the end of the course students will be able

- learnt a lot of new words. They also learnt the particularities and peculiarities of English grammar. As a result, they could speak and write English with the least possible error

SYLLAUS	(SEMESTER-II)	CREDITS: 01			INTERNAL ASSESSMENT (IA)			ESE
Subject Code:	CE02PES04	L	T	P	IA	MSE	TOTAL	
Subject:	BASIC ELECTRICAL ENGINEERING LAB	0	0	2	30	0	30	20

Course Learning Objectives:

1. To understand basic electrical wiring, measurements, and method.
2. To get acquainted with different measuring instruments.
3. To practically provide the concept of different theorems.
4. To make students understand d measurement errors.
5. To have actually hands-on on machines like transformers to get better understanding.

Course Content:

List of experiments/demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
  Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope).
- Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and Verification. Observation of phase differences between current and voltage. Resonancein R-L-C circuits.
- Transformers: Observation of the no-load current waveform on an oscilloscope (non-sinusoidalwave-shapeduetoB-Hcurvenonlinearityshouldbeshownalongwitha discussion about harmonics). Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
- Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents).
- Phase-shifts between the primary and secondary side. Cumulative three-phase power in balanced three-phase circuits.
- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winging - slip ring arrangement) and single-phase induction machine.
- Torque Speed Characteristic of separately excited dc motor.
- Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections. Torque-Slip Characteristic of an induction motor. Generator operation of an induction machine driven at super synchronous speed.
- Synchronous Machine operating as a generator: stand-alone operation with a load. Control of voltage through field excitation.
- Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d) Components of LT switchgear.

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

- Construct circuits and measure different electrical quantities.
- Analyze Single Phase and Three phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
- Acquire knowledge about different types of meters and take readings.

- Work on machines like transformers

SYLLAUS	(SEMESTER-II)	CREDITS: 01			INTERNAL ASSESSMENT (IA)			ESE
Subject Code:	CE02PES05	L	T	P	IA	MSE	TOTAL	
Subject:	ENGINEERING GRAPHICS & DESIGN LAB	1	0	3	30	0	30	20

Course Learning Objectives:

- To learn the basic of Engineering Drawing and Orthographic Projections
- To learn the Sections and Sectional Views of Right Angular Solids
- To learn the Isometric Projections covering and overview of Computer Graphics

Course Content:

UNIT-I
Introduction to Engineering Drawing
Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales.

UNIT-II
Orthographic Projections
Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;
Projections of Regular Solids
Inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale.

UNIT-III
Sections and Sectional Views of Right Angular Solids
Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

UNIT-IV
Isometric Projections covering,
Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

UNIT-V
Overview of Computer Graphics
Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

Suggested Text/Reference Books:

(i)Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
(ii)Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
(iii)Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
(iv)Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
(v)(Corresponding set of) CAD Software Theory and User Manuals

Outcomes: At the end of the course students will be able

- To execute the basics of Engineering Drawing and Orthographic Projections, Sections and Sectional Views of Right Angular Solids, Isometric Projections and basic Computer Graphic skill in further applications of engineering.