Syllabus of the courses where the revision was carried out program wise in the academic year 2019-2020

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Department of Civil Engineering

Syllabus revision Index for the Academic Year 2019-2020 B.Tech Civil Engineering

S.No	Name of the course	Percentage of syllabus change
1	Communicative English-I	90
2	Differential Equations and Linear Algebra	20
3	Engineering Physics	60
4	Engineering Physics lab	60
5	Basic Engineering Workshop	55
6	Chemistry of Materials	70
7	Engineering Chemistry Lab	50
8	Engineering Graphics and Design	55
9	Engineering Mechanics	20
10	Environmental Science	25
11	Management Science	20
12	Transportation Engineering	32.4
13	Construction Technology and Management	33.2
14	Engineering Geology Lab	25
15	Transportation Engineering Lab	20
16	Geotechnical Engineering - I	33.2
17	Geotechnical Engineering Lab	20

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)-Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

	transducers- Non-Destructive Testing-Applications. Crystallography & x-ray diffraction: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cellpacking fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.	radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO2 laserApplications. Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.
	UNIT-V: Magnetism: Classification based on Field, Temperature and order/disorder – atomicorigin – Ferromagnetism-Hysteresis- applications of magnetic materials (Para &Ferro). Dielectrics: Electric Polarization – Dielectric in DC fields – Internal field –Clausius Mossoti Equation – Dielectric loss- Ferroelectric Hysteresis and applications.	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization-Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials. Dielectrics: Introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Clausslus_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure- Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social- Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Chemistry	Chemistry of Materials
Course Code	171BS1T03	191BS2T06
Syllabus	UNIT- I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I: Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion-exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II: Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	UNIT - III: Polymers and Building Materials: Introduction to polymers, functionality of

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite. Steel – Types of Steel, chemical composition – applications of alloy steels Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors:-Type – I, Type II – Characteristics and applications Semi conductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis:-Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV: Corrosion Engineering: Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment. Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).
	UNIT - V: Water Technology Hard water:- Reasons for hardness – units of hardness - determination of hardness andalkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments - Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.	UNIT - V: Material Science and Engineering: Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Solgel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines NanoTubes:Carbon nano tubes-Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications. Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-

		Preparation-Propertiesand Applications. Appendix:Introduction to Smart Materials.

Dr. Aruna S

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Signature of the HOD

Head of the Department
Department of H & BS
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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Mechanics**	**Engineering Mechanics**
Course Code	**171ES1T02**	**191ES2T04**
Syllabus	**UNIT- I:** **Introduction to Engineering Mechanics** Basic Concepts **Systems of Forces:** Coplanar Concurrent Forces & Non-Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Friction: Introduction, limiting friction and impending motion, Coulomb's laws of dry friction, coefficient of friction, cone of friction.	**UNIT- I:** **Introduction to Engineering Mechanics:** Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force systems.
	UNIT- II: **Equilibrium of Systems of Forces:** Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, and Spatial Systems for concurrent forces. Lami's Theorem, Converse of the law of Triangle of forces, Converse of the law of polygon of forces condition of equilibrium.	**UNIT II** **Analysis of Structures:** Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections. **Virtual Work:** Equilibrium of ideal systems, work done by a force, work done by a couple, principle of virtual work.
	UNIT- III: **Centroid:** Centroid of simple figures (from basic principles) – Centroid of composite figures. **Centre of Gravity:** Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.	**UNIT III:** **Properties of Surfaces and Volumes:** Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus. **Moment of Inertia:** Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod, cylinder, cone, sphere, rectangular prism, radius of gyration.

	UNIT- IV: **Area Moment of Inertia:** Definition – Polar Moment of Inertia, Transfer Theorem, Moment of Inertia of composite figures. **Mass Moment of Inertia:** Moment of Inertia of masses, Transfer formula for Mass Moment of Inertia, Mass Moment of inertia of composite bodies.	**UNIT IV:** **Kinematics:** Fundamentals of kinematics of motion- Rotation of a rigid body about a fixed axis, introduction to plane motion. **Kinetics:** Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, Concepts of Friction
	UNIT – V: **Kinematics:** Basics of linear motion. **Kinetics:** Particle and Rigid body in translation – Central force motion – Equations of plane motion – Fixed axis rotation. **Work – Energy Method:** Equations for translation, Work-Energy Applications to particle motion, Connected system-Fixed axis rotation and plane motion. Impulse momentum method.	**UNIT V:** **Applications:** Principle of work and energy- Principle of conservation of energy, Concept of power, Conservation of linear and angular momentum, Principle of momentum and impulse, Types of impact.

Course Coordinator

Head of the Department

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Workshop& IT Workshop**	**Basic Engineering Workshop**
Course Code	**171ES2L02**	**191ES1L02**
Syllabus	**List of Experiments:** **Carpentry:** 1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint **Fitting:** 1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit **Black Smithy:** 1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt **House Wiring:** 1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance **Tin Smithy:** 1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel	**List of Experiments:** **Carpentry:** 1. Cross Lap Joint 2. Dovetail Joint 3. T - Joint **Fitting:** 1. Vee Fit 2. Square Fit **House Wiring:** 1. Parallel Connection of three bulbs 2. Series Connection of three bulbs **Tin Smithy:** 1. Taper Tray 2. Funnel 3. Plain Pipe **List of Augmented Experiments:** 1. Stair Case wiring 2. 2. Florescent Lamp Fitting
	Exercise 1: **Identification of peripherals of a computer** Block diagram of the CPU along with the configuration of the each peripheral and its functions.	

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Engineering Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L01
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of Rigidity modulus of a material- Torsional Pendulum....
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Determination of Young's modulus by method of single cantilever oscillations.
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Verification of laws of vibrations in stretched strings – Sonometer.
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Determination of spring constant of springs using coupled oscillators.
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6.Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	8. Determination of velocity of sound – Volume Resonator.	8. Measurement of magnetic susceptibility by Gouy's method.
	. 9. L- C- R Series Resonance Circuit.	9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
	10. Study of I/V Characteristics of Semiconductor diode.	10. Determination of dielectric constant by charging and discharging method
	11. I/V characteristics of Zener diode.	11. Determination of wavelength of Laser by diffraction grating
	12. Characteristics of Thermistor – Temperature Coefficients	12. Determination of particle size using Laser
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Determeination of Pressure variation using strain Gauge sensor.
	14. Energy Band gap of a Semiconductor p -	14.Determination of Moment of Inertia of a

	n junction.	Fly Wheel
	15. Hall Effect in semiconductors.	15.Determination of Velocity of sound – Volume Resoantor
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics	Engineering Physics
Course Code	171BS2T07	191BS1T02
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence – Interference in thinfilms (reflection geometry)— Newton's rings – construction and basic principle of Interferometer.	UNIT-I Crystal Structure: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer. Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes.	UNIT-II Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies. Ultrasonics:Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.
	UNIT-III: Polarization: Types of Polarization-production - Nicol Prism -Quarter wave plateand Half Wave plateworking principle of polarimeter (Sacharimeter) Lasers: Characteristics– Stimulated emission – Einstein's Transition Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	UNIT-III Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.
	UNIT-IV: Acoustics: Reverberation time - Sabine's formula – Acoustics of concert-hall. Ultrasonics: Production - Ultrasonic	UNIT-IV Laser: Introduction to wave optics & Interferometer-Characteristics– Spontaneous and Stimulated emission of

	Exercise 2: **System Assembling and Disassembling** Disassembling the components of a PC and assemble them back to working condition. **Exercise 3:** **Installation of softwares** Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools. **Exercise 4:** **Troubleshooting (Demonstration)** Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues. **Exercise 5:** **Network Configuration and Internet** Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web- Search Engines, Types of search engines, netiquette, cyber hygiene. **Exercise 6:** **MS-Office / Open Office** a. Word - Formatting, Page Borders, Reviewing, Equations, symbols. b. Spread Sheet - organize data, usage of formula, graphs and charts. c. Power point - features of power point, guidelines for preparing an effective Presentation. d. Access- creation of database, validate data. **Exercise 7:** **LaTeX** LaTeX - basic formatting, handling equations and images.	

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Drawing**	**Engineering Graphics and Design**
Course Code	**171ES2T03**	**191ES2T02**
Syllabus	**UNIT-I:** **Introduction to Engineering Drawing:** Lettering, Dimensioning, Types of lines. **Geometrical Constructions:** Construction of regular polygons by general method and inscribing circle method. Special methods for pentagon and hexagon. **Conic Sections:** Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods. **Scales:** Plain Scale, Diagonal Scale and Vernier Scales.	**Unit-I:** **Introduction to Engineering graphics:** Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes
	UNIT-II: **Orthographic Projections:** Introduction to orthographic projections, Projections of Points, Projections of Lines.	**UNIT-II:** **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.
	UNIT-III: **Projections of Planes:** Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.	**UNIT-III:** **Projections of solids:** Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.
	UNIT-IV: **Projections of Solids:** Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.	**UNIT-IV:** **Computer Aided Drafting** **Introduction to Computer Aided Drafting:** Basic drawing and editing commands-Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

	UNIT-V: **Isometric Projections** Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.	**UNIT-V:** **Isometric Projections:** Principles of isometric projection-Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

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Department of Civil Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Management Science	Management Science
Course Code	R1631011	171HS5T05
Syllabus	UNIT I Introduction to Management: Concept –nature and importance of Management –Generic Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization – Organizational typology- International Management: Global Leadership and Organizational behavior Effectiveness(GLOBE) structure	UNIT 1 Introduction to Management: Concept nature and importance of Management, Generic Functions of Management, and Evaluation of Management thought, Theories of Motivation, Decision making process, Designing organization structure, Principles of organization & Organizational typology.
	UNIT II Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).	UNIT 2 Operations Management :Principles and Types of Management, Work study, Statistical Quality Control, Control charts (P-chart, R-chart, and C-chart) Simple problems, Material Management: Need for Inventory control, EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis), Justin- Time(JIT) system, Total Quality Management(TQM), Six sigma, Supply chain management
	UNIT III Functional Management: Concept of HRM, HRD and PMIR- Functions of HR ManagerWage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions. Operationlizing	UNIT 3 Functional Management :Concept of HRM, HRD and PMIR, Functions of HR Manager, Wage payment plans(Simple Problems),Job Evaluation and Merit Rating,Marketing Management, Functions of Marketing, Strategies based on product Life Cycle, Channels of distributions.

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	change through performance management.	
	UNIT IV Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)	UNIT 4 Project Management: Development of Network, Difference between PERT and CPM, Identifying Critical Path, Probability, Project Crashing (Simple Problems)
	UNIT V Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives. Global strategies, theories of Multinational Companies	UNIT 5 Strategic Management :Vision, Mission, Goals, Strategy, Elements of Corporate Planning Process, Environmental Scanning ,SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives, Basic concepts of MIS, ERP, Capability Maturity Model(CMM) Levels, Balanced Score Card.
	UNIT VI Contemporary Management Practice: Basic concepts of MIS, MRP, Justin- Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management , Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Transportation Engineering - II	Transportation Engineering
Course Code	R1631015	171CE5T11
Syllabus	A.RAILWAY ENGINEERING UNIT – I Components of Railway Engineering: Permanent way components – Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints.	UNIT - I Introduction to Highway Engineering: Highway Development and Planning Highway development in India – Necessity for Highway Planning – Different Road Development Plans – Classification of Roads – Road Network Patterns – Highway Alignment – Factors affecting Alignment – Engineering Surveys. Highway Geometric Design: Importance of Geometric Design – Design controls and Criteria- Highway Cross Section Elements – Sight Distance Elements – Stopping sight Distance – Overtaking Sight Distance and intermediate Sight Distance – Design of Horizontal Alignment – Design of Super elevation and Extra widening – Design of Transition Curves –Design of Vertical alignment-Gradients – Vertical curves.
	UNIT – II Geometric Design of Railway Track: Alignment – Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – safe speed on curves – Transition curve – Compound curves – Reverse curves – Extra clearance on curves – widening of gauge on curves – vertical curves – cheek rails on curves	UNIT - II Traffic Engineering: Basic parameters of traffic –Volume –Speed and density –Traffic volume studies – Data collection and presentation –Speed studies – Data collection and presentation – Parking studies and parking characteristics. road traffic signs –Types and specifications –Road markings –Need for road markings –Types of road markings –Design of traffic signals – Webster method –IRC method

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	UNIT – III Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – Mechanical signalling system – Electrical signalling system – System for Controlling Train Movement – Interlocking – Modern signalling Installations.	UNIT – III Intersection Design: Types of intersections –Conflicts at intersections –Types of at-grade intersections channelization – Objectives –Traffic islands and design criteria –Types of grades – Separated intersections – Rotary intersection –Concept of rotary intersection and design criteria- Advantages and disadvantages of rotary intersection.
	B.AIRPORT ENGINEERING UNIT – IV Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics – Zoning laws – Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control	UNIT - IV Design of Pavements: Types of pavements – Functions and requirements of different components of pavements - Design Factors. Flexible Pavements: Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements. Rigid Pavements: Design Considerations –Wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements
	UNIT – V Runway Design: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strengthening of Airfield pavements – Airport Drainage – Design of surface and subsurface drainage.	UNIT - V Railway Engineering: Permanent way components –Cross section of permanent way –functions of various components like rails –Sleepers and ballast –Rail fastenings – Creep of rails – Theories related to creep – Adzing of sleepers –Sleeper density. gradients –Grade compensation –Cant and negative super elevation –Cantdeficiency. Airport Engineering: Factors affecting selection of site for airport –Aircraft characteristics –Geometric design of runway –Computation of runway length –Correction for runway length – Orientation of runway –Wind rose diagram.
	C.DOCKS & HARBOURS UNIT – VI Planning, Layout, Construction & Maintenance Of Docks & Harbors: Classification of ports – Requirement	

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	of a good port – classification of Harbors – Docks - Dry & wet docks – Transition sheds and workhouses – Layouts; Quays – construction of Quay walls – Wharves – Jetties – Tides - Tidal data and Analysis – Break waters – Dredging – Maintenance of Ports and Harbors – Navigational aids.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Construction Technology and Management	CONSTRUCTION TECHNOLOGY AND MANAGEMENT
Course Code	RT41013	171CE5E01
	UNIT- I Construction project management and its relevance – qualities of a project manager – project planning – coordination – scheduling - monitoring – bar charts – milestone charts – critical Path Method – Applications	UNIT –I: Introduction: Steps involved in planning - Objectives – Principles – Advantages - Limitations - Stages of planning - Scheduling - Preparation of construction schedules -Methods of scheduling - Bar charts -Mile stone charts – Controlling - Project work break down.
	UNIT -II Project Evaluation and Review Technique – cost analysis - updating – crashing for optimum cost – crashing for optimum resources – allocation of resources	UNIT – II: Project Management Through Networks: Objectives of network techniques - Fundamentals of network analysis - Events; Activities- Dummies - Types of networks - Choice of network type - Advantages of network techniques over conventional techniques. Program

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		Evaluation and Review Technique (PERT): Introduction - Earliest expected time - Latest allowable occurrence time - Slack - Critical path - Probability of completion time for a project.
Syllabus	UNIT- III Construction equipment – economical considerations – earthwork equipment – Trucks and handling equipment – rear dump trucks – capacities of trucks and handling equipment – calculation of truck production – compaction equipment – types of compaction rollers	UNIT – III: Critical Path Method (CPM): Introduction-Difference between CPM and PERT-Time estimates- Earliest event time- Latest event time- Float- Critical activities and critical path. Cost Control: Direct cost-indirect cost-total project cost- Optimization of cost through networks-Steps involved In optimization of cost- allocation of resources
	UNIT –IV Hoisting and earthwork equipment – hoists – cranes – tractors - bulldozers – graders – scrapers– draglines - clamshell buckets	UNIT – IV: Construction Equipment: Classification of construction equipment-Earth moving equipmentcapacities of trucks and handling equipment-calculation of truck production- Excavation equipment-Hauling equipment- Earth compaction equipment-Hoisting equipment.
	UNIT -V Concreting equipment – crushers – jaw crushers – gyratory crushers – impact crushers – selection of crushing equipment - screening of aggregate – concrete mixers – mixing and placing of concrete – consolidating and finishing	UNIT – V: Aggregate & Concreting Equipment: Crushers & Types of crushers-selection of crushing equipment- concrete mixers- mixing and placing of concrete-consolidating and finishingPiling & Pile driving equipment - form work- fabrication and erection
	UNIT –VI Construction methods – earthwork – piling – placing of concrete – form work – fabrication and erection – quality control and safety engineering	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	ENGINEERING GEOLOGY LAB	Engineering Geology Lab
Course Code	R1631017	171CE5L04
	LIST OF EXPERIMENTS 1. Physical properties of minerals: Mega-scopic identification of a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc… b. b) Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc… 2. Megascopic description and	List of Experiments: 1. To identify the physical properties of Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite 2. To identify the physical properties of Olivine, Kyanite, Asbestos, Tourmaline, Calcite, Gypsum 3. To identify the physical properties of Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite 4. To identify the physical properties of Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite,

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Syllabus	identification of rocks. a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc… b) Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc… c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc… 3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc. 4. Simple Structural Geology problems. 5. Bore hole data. 6. Strength of the rock using laboratory tests. 7. Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.	Granite Poryphery, Basalt. 5. To identify the physical properties of Sedimentary rocks – Sand stone, Ferruginous sand stone, Lime stone, Shale, Laterite, Conglomerate 6. To identify the physical properties of Metamorphic rocks Granite Gneiss, Slate, Muscovite & Biotite schist, Marble, Khondalite 7. Interpretation of topographical maps and satellite imagery 8. Drawing of cross sections of formations from geological maps showing tilted beds, faults, unconformities 9. Simple Structural Geology problems 10. Field work – To identify Mineral and Rock deposits, Geomorphology& Structural Geology of an area List of Augmented Experiments: (Any two of the following experiments can be performed) 11. Electrical resistivity and seismic survey methods 12. Stratigraphy of India and Andhra Pradesh and borehole data 13. Finding Strike and Dip of geological formations using Brunton Compass

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Transportation Engineering Lab	Transportation Engineering Lab
Course Code	R1631018	171CE5L05
	I. ROAD AGGREGATES: 1. Aggregate Crushing value 2. Aggregate Impact Test. 3. Specific Gravity and Water Absorption. 4. Attrition Test 5. Abrasion Test. 6. Shape tests II. BITUMINOUS	List of Experiments: 1. To determine the Aggregate crushing value of aggregates 2. To determine the Aggregate impact value of aggregates 3. To determine the Flakiness index and elongation index of aggregates 4. To determine the Deval's

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Syllabus	MATERIALS: 1. Penetration Test. 2. Ductility Test. 3. Softening Point Test. 4. Flash and fire point tests. 5. Stripping Test 6. Viscosity Test. BITUMINOUS MIX: 1. Marshall Stability test. IV. TRAFFIC SURVEYS: 1. Traffic volume study at mid blocks. 2. Traffic Volume Studies (Turning Movements) at intersection. 3. Spot speed studies. 4. Parking study. V. DESIGN & DRAWING: 1. Earthwork calculations for road works. 2. Drawing of road cross sections. 3. Rotors intersection design.	abrasion value of aggregates 5. To determine the Los angles abrasion value of aggregates. 6. To determine the Specific gravity & Water absorption of aggregates. 7. To determine the Penetration value and Softening point of bitumen. 8. To determine the Flash & fire point of bitumen. 9. To determine the Viscosity of bitumen. 10. To determine the Ductility value of bitumen List of Augmented Experiments: (Any two of the following experiments can be performed) 11. To determine the spot speed 12. Marshall mix design 13. CBR test for soils

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Geotechnical Engineering - I	Geotechnical Engineering - I
Course Code	R1632012	171CE6T15
	UNIT – I Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume	UNIT-I Introduction & Index properties of soils: Soil formation – soil structure and clay mineralogy – Adsorbed water –

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Syllabus	relationship –Relative density , Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.	Mass–volume relationship –Laboratory tests for soil properties –Relative density. Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification – Engineering properties of soils- Definitions.
	UNIT – II Index Properties Of Soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.	UNIT-II Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law– permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses
	UNIT –III Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law-permeability – Factors affecting – laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition – 2-D flow and Laplace's equation - Seepage through soils – Flow nets: Characteristics and Uses.	UNIT-III Seepage through Soils: Seepage through soils –Flow nets: Characteristics and Uses– quick sand condition. Stress Distribution in Soils: Stresses induced by applied loads - Boussinesq's and Westergaa rd's theories for point loads and areas of different shapes–Newmark's influence chart
	UNIT – IV Stress Distribution In Soils: Stresses induced by applied loads - Boussinesq's and Westergaard's theories for point loads and areas of different shapes– Newmark's influence chart – 2:1 stress distribution method.	UNIT-IV Compaction: Mechanism of compaction – Factors affecting compaction– Effects of compaction on soil properties – Field compaction Equipment – compaction control. Consolidation: Stress history of soil – Compressibility of soils– Spring Analogy –Terzaghi's one dimensional consolidation theory–Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation –Total settlement
	UNIT – V Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring	UNIT-V Shear strength of soils: Basic mechanism of shear strength – Mohr – Coulomb failure theories – Shear strength determination – Strength tests

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	Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (cv) - Over consolidated and normally consolidated clays.	based on drainage conditions – Shear strength of sands – Critical Void Ratio – Stress-Strain behaviour of clays – Liquefaction.
.	UNIT – VI Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination- various drainage conditions.	.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision

Course Title	Geotechnical Engineering Lab	GEOTECHNICAL ENGINEERING LAB
Course Code	R163201C	171CE6L06
Syllabus	LIST OF EXPERIMENTS 1. Specific gravity, G 2. Atterberg's Limits. 3. Field density-Core cutter and Sand replacement methods 4. Grain size analysis by sieving 5. Hydrometer Analysis Test 6. Permeability of soil - Constant and Variable head tests 7. Compaction test 8. Consolidation test (to be demonstrated) 9. Direct Shear test 10. Triaxial Compression test (UU Test) 11. Unconfined Compression test 12. Vane Shear test 13. Differential free swell (DFS) 14. CBR Test At least Ten experiments shall be conducted.	List of Experiments: 1. To determine the water content by oven drying method and specific gravity of soil by usingpycnometer. 2. To determine the Atterberglimits. 3. To determine the Gradation analysis by Sieveanalysis. 4. To determine the field unit weight by a) Core cutter method b) Sand Replacement method. 5. To determine the permeability by Constant headmethod. 6. To determine the permeability by Variable headmethod. 7. To determine the maximum dry density by standard proctor test. 8. To determine the California bearing ratio by CBRtest. 9. To determine the shear parameters by Direct Shear test and Vane ShearTest. 10. To determine the shear parameters by Triaxial Compressiontest. List of Augmented Experiments: (Any two experiments to be conducted from the following) 11. To determine the Gradation analysis by Hydrometer analysis. 12. To determine the maximum dry density by Modified proctor test. 13. To determine the Consolidation of the soil.

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Department of Electrical and Electronics Engineering

Syllabus revision Index for 2019-2020

S. No	Name of the course	Percentage of syllabus change
1	Communicative English	90
2	Differential Equations and Linear Algebra	20
3	Engineering Chemistry	80
4	Engineering Chemistry Lab	50
5	Environmental Science	25
6	Basic Engineering workshop	50
7	Partial Differential Equations and Vector Calculus	40
8	Applied Physics	40
9	Applied Physics Lab	60
10	Signals and Systems	25
11	Control Systems Lab	25
12	Micro Processor and Micro Controllers	30
13	Power Electronics Lab	20
14	Optimization Techniques	30

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HSIT01	191HSIT01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay- Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)- Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Chemistry	Engineering Chemistry
Course Code	171BS1T05/171BS2T05	191BS1T04/191BS2T09
Syllabus	UNIT - I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques)- Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels— Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode, Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	Unit-III Polymer Chemistry: Introduction to polymers, functionality of monomers, chain

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PE,PVC, Bakelite, Teflon and Nylon-6, 6. Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors: -Type –I, Type II – Characteristics and applications Semiconductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis: -Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV Energy Sources And Applications: Introduction- sources of renewable energy –Hydro power, Biomass and Bio-fuels Solar energy – Introduction - Physical and Chemical properties of Silicon- Preparation of Semi-conductors - Doping of Silicon- p and n type semi-conductors PV cell / solar cell- Working & Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique-applications of solar energy. Fuels: Introduction- classification- liquid fuels- Refining of petroleum- cracking-Reforming Gaseous fuels-LPG & CNG Applications.
	UNIT - V: Non-Conventional Energy Sources: Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance Non-conventional energy sources: (i) Hydropower include setup a hydropower plant (schematic diagram) (ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant (iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level. (iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open	UNIT - V Material Science And Engineering: Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM). NanoTubes: Carbon nano tubes- Types of CNT's- preparation methods –Arc discharge, Laser abiliation and chemical vapour deposition – properties and applications. Green Chemistry: Introduction, priniciples of green chemistry (Ex: Solvent, Catalyst, Reactant) Band Theory of Solids:

	cycle OTEC, hybrid OTEC, schematic diagram and explanation. (v) Biomass and biofuels.	Introduction –Explanation of conductors, semi conductors, Insulators by Band Theory- Super conductors-Types-Preparation-Properties and Applications. Appendix: Introduction to Molecular Machines and Molecular Switches

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

Dr. Aura. S

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure-Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social- Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Workshop& IT Workshop**	**Basic Engineering Workshop**
Course Code	**171ES2L02**	**191ES1L02**
Syllabus	**Trade:** **Carpentry:** 1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint **Fitting:** 1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit **Black Smithy:** 1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt **House Wiring:** 1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance **Tin Smithy:** 1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel	**List of Experiments:** **Carpentry:** 1. Cross Lap Joint 2. Dovetail Joint 3. T - Joint **Fitting:** 1. Vee Fit 2. Square Fit **House Wiring:** 1. Parallel Connection of three bulbs 2. Series Connection of three bulbs **Tin Smithy:** 1. Taper Tray 2. Funnel 3. Plain Pipe **List of Augmented Experiments:** 1. Stair Case wiring 2. 2. Florescent Lamp Fitting
	Exercise 1: **Identification of peripherals of a computer** **Block diagram of the CPU along with the configuration of the each peripheral and its functions.** **Exercise 2:**	

	System Assembling and Disassembling **Disassembling the components of a PC and assemble them back to working condition.** **Exercise 3:** **Installation of softwares** **Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools.** **Exercise 4:** **Troubleshooting (Demonstration)** **Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues.** **Exercise 5:** **Network Configuration and Internet** **Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web- Search Engines, Types of search engines, netiquette, cyber hygiene.** **Exercise 6:** **MS-Office / Open Office** **a. Word - Formatting, Page Borders, Reviewing, Equations, symbols.** **b. Spread Sheet - organize data, usage of formula, graphs and charts.** **c. Power point - features of power point, guidelines for preparing an effective Presentation.** **d. Access- creation of database, validate data.** **Exercise 7:** **LaTeX** **LaTeX - basic formatting, handling equations and images.**	

K. L. Kothare

Course Coordinator

Head of The Department
Dept. Of Electrical & Electronics Engineering
Vishwakarma Institute of Technology, Pune-37

Head of the Department

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	MATHEMATICS-III	Partial Differential Equations and Vector Calculus
Course Code	171BS2T06	191BS2T05
Syllabus	UNIT - I: Laplace transforms: Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac's delta function, Periodic functions.	UNIT - I: Special Functions: Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.
	UNIT- II: Inverse Laplace transforms: Inverse Laplace transforms – Convolution theorem (without proof), Second shifting theorem. *(MATLAB Exercise: Computing Laplace transform off (t) using symbolic toolbox, Solving initial value problems using 'dsolve') Applications: Evaluating improper integrals, solving initial value problems using Laplace transforms.	UNIT II: Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.
	UNIT - III: Multiple integrals and Beta, Gamma functions: Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Applications: Finding Areas and Volumes.	UNIT III: Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals,Finding Area and Volume as a double integral
	UNIT - IV: Vector Differentiation: Gradient - Directional Derivatives - Divergence- Curl - Laplacian operator - Vector identities. Applications: Equation of continuity, potential surfaces	UNIT IV: Vector Differentiation: Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.
	UNIT - V: Vector Integration: Line integral – Work done - Surface and volume integrals,	UNIT V: Vector Integration: Introduction, Line integral, Work done, Surface and

	Green's Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.	volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04/171BS2T04	191BS1T03/191BS2T07
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer.	UNIT-I Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes	UNIT-II Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P. Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism – Quarter wave plate and Half Wave plate- working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition Probabilities Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser- Applications	. UNIT-III Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi Dirac distribution function - expression for Fermi energy -Density of states. BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy

		bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: Quantum Mechanics: Introduction –Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy..	UNIT-IV Semiconductor Physics: Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & ntype - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: Band Theory of Solids: Bloch's theorem (qualitative) – Kronig – Penney model (Qualitative) – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. Semiconductor Physics: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.–	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius- Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Applied Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L03/191BS2L05
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Newton's rings – Radius of Curvature of Plano - Convex Lens
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Energy Band gap of a Semiconductor p - n junction
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6. Characteristics of Thermistor – Temperature Coefficients
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Determination of dielectric constant by charging and discharging method
	8. Determination of velocity of sound – Volume Resonator.	8. Determination of resistivity of semiconductor by Four probe method
	. 9. L- C- R Series Resonance Circuit.	. 9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	10. Study of I/V Characteristics of Semiconductor diode.	10. Measurement of magnetic susceptibility by Quincke's method
	11. I/V characteristics of Zener diode.	11. Dispersive power of diffraction grating.
	12. Characteristics of Thermistor – Temperature Coefficients	12. Resolving Power of telescope
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Resolving power of grating
	14. Energy Band gap of a Semiconductor p -	14. Determination of Hall voltage and Hall

	n junction.	coefficients of a given semiconductor using Hall-effect.
	15. Hall Effect in semiconductors.	15. Variation of dielectric constant with temperature
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Signals and Systems	Signals and Systems
Course Code	R1631023	171EE5T13
Syllabus	**UNIT- I: Introduction:** Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, mean square error, closed or complete set of orthogonal functions, Orthogonality in complex functions.	**UNIT I Signals:** Introduction, Representation of signals, Elementary signals, Basic Operations on signals, Classification of Signals. **Signal Analysis:** Analogy between vectors and signals, Orthogonal vector space, Orthogonal signal space, Signal approximation by a set of mutual orthogonal signals, mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions.
	UNIT –II: Fourier Series and Fourier Transform: Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals,	**UNIT II Fourier Series:** Representation of periodic signals using Fourier series, Trigonometric Fourier series and Exponential Fourier series, properties of Fourier series, Complex Fourier spectrum. **Fourier Transforms**: Deriving Fourier transform (FT) from Fourier series, Existence of Fourier transform, Fourier transform of standard signals, properties of Fourier transforms, Fourier transform of periodic signals, Fourier transforms

	properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.	involving impulse signal and Signum signal.
	UNIT –III: Sampling Theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling.	**UNIT III Convolution and Correlation of Signals:** Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution properties of Fourier transforms. Signal Comparison: Cross correlation and auto correlation of signals, properties of correlation function, Energy density spectrum, Power density spectrum, Relation between auto correlation function and energy/power spectral density function, Relation between convolution and correlation.
	UNIT-IV: Analysis Of Linear Systems: Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time. Cross-correlation and auto-correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation, Detection of periodic signals	**UNIT IV Signal Transmission Through LTI Systems:** Classification of systems, Linear time invariant (LTI) system, Impulse response of LTI systems, Properties of LTI systems, Transfer function of an LTI system, Filter characteristics of linear systems, Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, relationship between bandwidth and rise time. **Sampling:** Sampling, Sampling theorem – Graphical and analytical proof for Band Limited Signals, effect of under sampling – Aliasing, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Sampling of Band Pass signals.

	UNIT –V: Laplace Transforms: Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.	**UNIT V Laplace Transforms:** Review of Laplace transform (LT) , Existence of Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of Laplace transforms, relation between LTs, and FT of a signal, Inverse Laplace transform, Laplace transform using waveform synthesis. **Z–Transforms:** Z-Transform of a discrete time signal, Distinction between Laplace, Fourier and Z-transforms, Region of convergence in Z-Transform, constraints on ROC for various classes of discrete signals, Properties of Z-transforms, properties of Z-transforms, Inverse Z-transform.
	UNIT –VI: Z–Transforms: Fundamental difference between continuous-time and discrete-time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.	

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Department of Electrical and Electronics Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Control Systems Lab	Control Systems Lab
Course Code	R1631027	171EE5L06
Syllabus	1.Time response of Second order system 2.Characteristics of Synchros 3.Programmable logic controller – characteristics of stepper motor 4.Effect of feedback on DC servo motor 5.Effect of P, PD, PI, PID Controller on a second order systems 6.Lag and lead compensation – Magnitude and phase plot 7.DC position control system 8.Transfer function of DC motor 9.Temperature controller using PID 10.Characteristics of magnetic amplifiers 11.Characteristics of AC servo motor 12.Characteristics of DC servo motor 13.Potentiometer as an error detector	1.To determine time response of Second order system. 2.To study the characteristics of Synchros - Transmitter and receiver. 3.To study the characteristics of stepper motor using Programmable logic controller. 4.To study the effect of feedback on DC servo motor. 5.To study the effect of P, PD, PI, PID Controller on a second order systems. 6.To Draw the magnitude and phase plots of lag and lead compensators. 7.To study the DC position control system. 8.To determine the transfer function of DC motor. 9.To study temperature controller using PID. 10.To draw the load Characteristics of magnetic amplifiers. **Augmented experiments:** 1.To draw the speed - torque characteristics of AC servo motor. 2.To draw the speed - torque characteristics of DC servo motor. 3.To study the Potentiometer as an error detector. 4.Verification of logic gates using PLC. 5.To simulate root locus using MATLAB. 6.To simulate Bode plot using MATLAB

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Micro Processors and Micro controllers	Micro Processor and Micro Controllers
Course Code	R1632023	171EE6T16
Syllabus	**UNIT–I: Introduction to Microprocessor Architecture** Introduction and evolution of Microprocessors– Architecture of 8086–Register Organization of 8086–Memory organization of 8086–General bus operation of 8086–Introduction to 80286–80386 and 80486 and Pentium.	**UNIT I: Introduction to microprocessor architecture:** Introduction and evolution of Microprocessors, Architecture of 8086, Register Organization of 8086, Memory organization of 8086, General bus operation of 8086, Introduction to 80286,80386 and 80486 and Pentium.
	UNIT–II: Minimum and Maximum Mode Operations Instruction set, addressing modes– Minimum and Maximum mode operations of 8086–8086 Control signal interfacing–Read and write cycle timing diagrams.	**UNIT II: Minimum and maximum mode operations:** Instruction set, addressing modes, assembler directives, Minimum and Maximum mode operations of 8086, 8086 Control signal interfacing, Read and write cycle timing diagrams.
	UNIT–III: I/O Interface 8255 PPI– Architecture of 8255–Modes of operation– Interfacing I/O devices to 8086 using 8255–Interfacing A to D converters–Interfacing D to A converters– Stepper motor interfacing– Static memory interfacing with 8086–DMA controller (8257)–Architecture– Interfacing 8257 DMA controller– Programmable Interrupt Controller (8259)–Command words and operating modes of 8259–Interfacing of 8259–Keyboard/display controller (8279)–Architecture–Modes of operation–Command words of	**UNIT III: 8086 interfacing:** Semiconductor memories interfacing (RAM, ROM), Intel 8259 programmable interrupt controller, Intel 8237a DMA controller, Intel 8255 programmable peripheral interface, Intel 8279 programmable keyboard/display controller, keyboard interfacing, stepper motor, A/D and D/A converters.

	8279– Interfacing of 8279.	
	UNIT–IV: Introduction to 8051 Micro Controller Overview of 8051 Micro Controller– Architecture– Register set–I/O ports and Memory Organization– Interrupts–Timers and Counters– Serial Communication.	**UNIT IV: Introduction to 8051 micro controller:** Overview of 8051 Micro Controller, Architecture, Register set, I/O ports and Memory Organization, Interrupts, Timers and Counters, Serial Communication. **PIC architecture:** Block diagram of basic PIC 18 micro controller, registers I/O ports.
	UNIT– V: PIC Architecture Block diagram of basic PIC 18 micro controller, registers I/O ports.	**UNIT V: Cyber physical systems and industrial applications of 8051:** Applications of Micro Controllers, Interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard Interfacing, Interfacing Seven Segment Display, ADC and DAC Interfacing.
	UNIT– VI: Programming in C for PIC: Data types, I/O programming, logical operations, data conversion	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Power Electronics Lab	Power Electronics Lab
Course Code	R1632026	171EE6L08
Syllabus	1.Study of Characteristics of Thyristor, MOSFET & IGBT. 2.Design and development of a firing circuit for Thyristor. 3.Design and development of gate drive circuits for IGBT. 4.Single -Phase Half controlled converter with R and RL load 5.Single -Phase fully controlled bridge converter with R and RL loads 6.Single -Phase AC Voltage Regulator with R and RL Loads 7.Single -Phase square wave bridge inverter with R and RL Loads 8.Three- Phase fully controlled converter with RL–load. 9.Design and verification of voltages gain of Boost converter in Continuous Conduction Mode(CCM) and Discontinuous Conduction Mode(DCM). 10.Design and verification of voltages ripple in buck converter in CCM operation. 11.Single -phase PWM inverter with sine triangle PWM technique. 12.3-phase AC-AC voltage regulator with R-load.	1.Study of Characteristics of Thyristor, MOSFET & IGBT. 2.Design and development of a firing circuit for Thyristor. 3.Design and development of gate drive circuits for IGBT. 4.Single -Phase half-controlled converter with R and RL load 5.Single -Phase fully controlled bridge converter with R and RL loads 6.Single -Phase AC Voltage Regulator with R and RL Loads 7.Single -Phase square wave bridge inverter with R and RL Loads 8.Three- Phase fully controlled converter with RL–load. 9.Design and verification of voltages gain of Boost converter in Continuous Conduction Mode (CCM) and Discontinuous Conduction Mode (DCM). 10.Design and verification of voltages ripple in buck converter in CCM operation. Augmented experiments: 1.Single -phase PWM inverter with sine triangle PWM technique. 2.3- Phase AC-AC voltage regulator with R-load. 3.Simulation of Buck, Boost and Buck-Boost converter. 4.Simulationof SPWM controlled Three-phase voltage source inverter.

		5.Simulation of 3 phase half and full wave converter with R, RL, RLE and RE loads. Plot the waveforms for Voltage across and current through the switch. 6.Closed Loop simulation- Buck/Boost DC-DC converter.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Optimization Techniques**	**Optimization Techniques**
Course Code	**RT41030**	**R164102E**
Syllabus	**UNIT – I: Introduction and Classical Optimization Techniques:** Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.	**UNIT- I Introduction and Classical Optimization Techniques:** Statement of an Optimization problem, design vector, design constraints, constraint surface, objective function and objective function surfaces – classification of Optimization problems.
	UNIT – II: Classical Optimization Techniques Single Variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.	**UNIT- II Classical Optimization Techniques:** Single variable Optimization, multi variable Optimization without constraints, necessary and sufficient conditions for minimum/maximum, multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers, multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.
	UNIT – III: Linear Programming: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm - Duality in Linear Programming – Dual Simplex method.	**UNIT- III Linear Programming:** Standard form of a linear programming problem, geometry of linear programming problems, definitions and theorems, solution of a system of linear simultaneous equations, pivotal reduction of a general system of equations, motivation to the simplex method, simplex algorithm, Duality in Linear Programming and Dual Simplex method.
	UNIT – IV: Transportation Problem	**UNIT- IV Nonlinear Programming:** Unconstrained cases One-dimensional

	Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel's approximation method – testing for optimality of balanced transportation problems – Special cases in transportation problem.	minimization methods: Classification, Fibonacci method and Quadratic interpolation method, Univariate method, Powell's method and steepest descent method. **Constrained cases**-Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method, Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.
	UNIT – V: Nonlinear Programming: Unconstrained cases - One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method - Univariate method, Powell's method and steepest descent method. **Constrained cases** - Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.	**UNIT – V: Introduction to Evolutionary Methods:** Evolutionary programming methods - Introduction to Genetic Algorithms (GA)– Control parameters –Number of generation, population size, selection, reproduction, crossover and mutation – Operator selection criteria – Simple mapping of objective function to fitness function – constraints – Genetic algorithm steps – Stopping criteria – Simple examples.
	UNIT – VI: Dynamic Programming: Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.	**UNIT – VI: Introduction to Swarm Intelligence Systems:** Swarm intelligence programming methods - Basic Partial Swarm Optimization – Method – Characteristic features of PSO procedure of the global version – Parameters of PSO (Simple PSO algorithm – Operators selection criteria – Fitness function constraints) – Comparison with other evolutionary techniques – Engineering applications of PSO.

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Department of Mechanical Engineering

Syllabus revision Index (2019-20)

S. No	Name of the course	Percentage of syllabus change
1	Communicative English	90
2	Differential Equations and Linear Algebra	20
3	Engineering Physics	60
4	Engineering Physics Lab	60
5	Environmental Science	50
6	Basic Engineering Workshop	72
7	Partial Differential Equations& Vector Calculus	40
8	Chemistry of Materials	70
9	Engineering Graphics and design	45
10	Engineering Mechanics	20
11	Engineering Chemistry Lab	50
12	Design Of Machine Members-II	20
13	Automobile Engineering	36
14	Thermal Engineering Lab	28
15	Metrology &Instrumentation	48
16	Non-Destructive Evaluation	20
17	Machine Tools Lab	20
18	Metrology &Instrumentation Lab	24
19	CAD/CAM Lab	20

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)-Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics	Engineering Physics
Course Code	171BS2T07	191BS1T02
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence – Interference in thinfilms (reflection geometry)– Newton's rings – construction and basic principle of Interferometer.	UNIT-I Crystal Structure: Basis and lattice – Crystal Systems – Bravais Lattice – Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer. Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes.	UNIT-II Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies. Ultrasonics:Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.
	UNIT-III: Polarization: Types of Polarization-production - Nicol Prism -Quarter wave plateand Half Wave plateworking principle of polarimeter (Sacharimeter) Lasers: Characteristics– Stimulated emission – Einstein's Transition Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	UNIT-III Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.
	UNIT-IV: Acoustics: Reverberation time - Sabine's formula – Acoustics of concert-hall. Ultrasonics: Production - Ultrasonic	UNIT-IV Laser: Introduction to wave optics & Interferometer-Characteristics– Spontaneous and Stimulated emission of

	transducers- Non-Destructive Testing-Applications. Crystallography & x-ray diffraction: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cellpacking fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.	radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO2 laserApplications. Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.
	UNIT-V: Magnetism: Classification based on Field, Temperature and order/disorder – atomicorigin – Ferromagnetism-Hysteresis- applications of magnetic materials (Para &Ferro). Dielectrics: Electric Polarization – Dielectric in DC fields – Internal field –Clausius Mossoti Equation – Dielectric loss- Ferroelectric Hysteresis and applications.	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization-Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials. Dielectrics: Introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Engineering Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L01
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of Rigidity modulus of a material- Torsional Pendulum....
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Determination of Young's modulus by method of single cantilever oscillations.
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Verification of laws of vibrations in stretched strings – Sonometer.
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Determination of spring constant of springs using coupled oscillators.
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6.Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	8. Determination of velocity of sound – Volume Resonator.	8. Measurement of magnetic susceptibility by Gouy's method.
	. 9. L- C- R Series Resonance Circuit.	9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
	10. Study of I/V Characteristics of Semiconductor diode.	10. Determination of dielectric constant by charging and discharging method
	11. I/V characteristics of Zener diode.	11. Determination of wavelength of Laser by diffraction grating
	12. Characteristics of Thermistor – Temperature Coefficients	12. Determination of particle size using Laser
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Determeination of Pressure variation using strain Gauge sensor.
	14. Energy Band gap of a Semiconductor p -	14.Determination of Moment of Inertia of a

	n junction.	Fly Wheel
	15. Hall Effect in semiconductors.	15.Determination of Velocity of sound – Volume Resoantor
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure- Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Workshop& IT Workshop	Basic Engineering Workshop
Course Code	171ES2L02	191ES1L02
Syllabus	**List of Experiments:** **Carpentry:** 1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint **Fitting:** 1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit **Black Smithy:** 1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt **House Wiring:** 1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance **Tin Smithy:** 1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel	**List of Experiments:** **Carpentry:** 1. Cross Lap Joint 2. Dovetail Joint 3. T - Joint **Fitting:** 1. Vee Fit 2. Square Fit **House Wiring:** 1. Parallel Connection of three bulbs 2. Series Connection of three bulbs **Tin Smithy:** 1. Taper Tray 2. Funnel 3. Plain Pipe **List of Augmented Experiments:** 1. Stair Case wiring 2. 2. Florescent Lamp Fitting
	Exercise 1: **Identification of peripherals of a computer** Block diagram of the CPU along with the configuration of the each peripheral and its functions.	

	Exercise 2: **System Assembling and Disassembling** Disassembling the components of a PC and assemble them back to working condition. **Exercise 3:** **Installation of softwares** Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools. **Exercise 4:** **Troubleshooting (Demonstration)** Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues. **Exercise 5:** **Network Configuration and Internet** Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web- Search Engines, Types of search engines, netiquette, cyber hygiene. **Exercise 6:** **MS-Office / Open Office** a. Word - Formatting, Page Borders, Reviewing, Equations, symbols. b. Spread Sheet - organize data, usage of formula, graphs and charts. c. Power point - features of power point, guidelines for preparing an effective Presentation. d. Access- creation of database, validate data. **Exercise 7:** **LaTeX** LaTeX - basic formatting, handling equations and images.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	MATHEMATICS-III	Partial Differential Equations and Vector Calculus
Course Code	171BS2T06	191BS2T05
Syllabus	UNIT - I: Laplace transforms: Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac's delta function, Periodic functions.	UNIT - I: Special Functions: Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.
	UNIT- II: Inverse Laplace transforms: Inverse Laplace transforms – Convolution theorem (without proof), Second shifting theorem. *(MATLAB Exercise: Computing Laplace transform off (t) using symbolic toolbox, Solving initial value problems using 'dsolve') Applications: Evaluating improper integrals, solving initial value problems using Laplace transforms.	UNIT II: Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.
	UNIT - III: Multiple integrals and Beta, Gamma functions: Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Applications: Finding Areas and Volumes.	UNIT III: Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals,Finding Area and Volume as a double integral
	UNIT - IV: Vector Differentiation: Gradient - Directional Derivatives - Divergence- Curl - Laplacian operator - Vector identities. Applications: Equation of continuity, potential surfaces	UNIT IV: Vector Differentiation: Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.
	UNIT - V: Vector Integration: Line integral – Work done - Surface and volume integrals,	UNIT V: Vector Integration: Introduction, Line integral, Work done, Surface and

	Green's Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.	volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Chemistry	Chemistry of Materials
Course Code	171BS1T03	191BS2T06
Syllabus	UNIT- I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I: Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boier corrosion, Industrial water treatment- zeolite and ion-exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II: Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	UNIT - III: Polymers and Building Materials: Introduction to polymers, functionality of

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite. Steel – Types of Steel, chemical composition – applications of alloy steels Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors:-Type – I, Type II – Characteristics and applications Semi conductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis:-Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV: Corrosion Engineering: Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment. Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).
	UNIT - V: Water Technology Hard water:- Reasons for hardness – units of hardness - determination of hardness andalkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments - Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.	UNIT - V: Material Science and Engineering: Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Solgel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines NanoTubes:Carbon nano tubes-Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications. Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-

		Preparation-Propertiesand Applications. Appendix:Introduction to Smart Materials.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Drawing**	**Engineering Graphics and Design**
Course Code	**171ES2T03**	**191ES2T02**
Syllabus	**UNIT-I:** **Introduction to Engineering Drawing:** Lettering, Dimensioning, Types of lines. **Geometrical Constructions:** Construction of regular polygons by general method and inscribing circle method. Special methods for pentagon and hexagon. **Conic Sections:** Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods. **Scales:** Plain Scale, Diagonal Scale and Vernier Scales.	**Unit-I:** **Introduction to Engineering graphics:** Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes
	UNIT-II: **Orthographic Projections:** Introduction to orthographic projections, Projections of Points, Projections of Lines.	**UNIT-II:** **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.
	UNIT-III: **Projections of Planes:** Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.	**UNIT-III:** **Projections of solids:** Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.
	UNIT-IV: **Projections of Solids:** Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.	**UNIT-IV:** **Computer Aided Drafting** **Introduction to Computer Aided Drafting**: Basic drawing and editing commands-Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

	UNIT-V: **Isometric Projections** Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.	**UNIT-V:** **Isometric Projections:** Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Mechanics**	**Engineering Mechanics**
Course Code	**171ES1T02**	**191ES2T04**
Syllabus	**UNIT- I:** **Introduction to Engineering Mechanics** Basic Concepts **Systems of Forces:** Coplanar Concurrent Forces & Non-Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Friction: Introduction, limiting friction and impending motion, Coulomb's laws of dry friction, coefficient of friction, cone of friction.	**UNIT- I:** **Introduction to Engineering Mechanics:** Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force systems.
	UNIT- II: **Equilibrium of Systems of Forces:** Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, and Spatial Systems for concurrent forces. Lami's Theorem, Converse of the law of Triangle of forces, Converse of the law of polygon of forces condition of equilibrium.	**UNIT II** **Analysis of Structures:** Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections. **Virtual Work:** Equilibrium of ideal systems, work done by a force, work done by a couple, principle of virtual work.
	UNIT- III: **Centroid:** Centroid of simple figures (from basic principles) – Centroid of composite figures. **Centre of Gravity:** Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.	**UNIT III:** **Properties of Surfaces and Volumes:** Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus. **Moment of Inertia:** Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod, cylinder, cone, sphere, rectangular prism, radius of gyration.

	UNIT- IV: **Area Moment of Inertia:** Definition – Polar Moment of Inertia, Transfer Theorem, Moment of Inertia of composite figures. **Mass Moment of Inertia:** Moment of Inertia of masses, Transfer formula for Mass Moment of Inertia, Mass Moment of inertia of composite bodies.	**UNIT IV:** **Kinematics:** Fundamentals of kinematics of motion- Rotation of a rigid body about a fixed axis, introduction to plane motion. **Kinetics:** Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, Concepts of Friction
	UNIT – V: **Kinematics:** Basics of linear motion. **Kinetics:** Particle and Rigid body in translation – Central force motion – Equations of plane motion – Fixed axis rotation. **Work – Energy Method:** Equations for translation, Work-Energy Applications to particle motion, Connected system-Fixed axis rotation and plane motion. Impulse momentum method.	**UNIT V:** **Applications:** Principle of work and energy-Principle of conservation of energy, Concept of power, Conservation of linear and angular momentum, Principle of momentum and impulse, Types of impact.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Design of Machine Members -II**	**Design of Machine Members -II**
Course Code	**R1631031**	**171ME5T11**
Syllabus	**UNIT-I:** **Bearings:** Classification of bearings-applications, types of journal bearings – lubrication – bearing modulus – full and partial bearings – clearance ratio – heat dissipation of bearings, bearing materials – journal bearing design – ball and roller bearings – static loading of ball & roller bearings, bearing life.	**UNIT-I:** **Bearings:** Classification of bearings-applications, types of journal bearings, lubrication, bearing modulus, full and partial bearings, clearance ratio, heat dissipation of bearings, bearing materials, journal bearing design, ball and roller bearings, static loading of ball & roller bearings.
	UNIT-II: **Engine Parts:** Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – cranks and crank shafts, strength and proportions of over hung and center cranks – crank pins, crank shafts. Pistons, forces acting on piston – construction design and proportions of piston, cylinder, cylinder liners	**UNIT-II:** **Engine Parts:** Connecting Rod, thrust in connecting rod, stress due to whipping action on connecting rod ends, cranks and crank shafts, strength and proportions of over hung and center cranks, crank pins, crank shafts. Pistons, forces acting on piston, construction design and proportions of piston, cylinder, cylinder liners
	UNIT-III: **Design of curved beams:** introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and t-section, design of crane hooks, c –clamps.	**UNIT-III:** **Design of Curved Beams:** Introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and T-section, design of crane hooks, C clamps.
	UNIT-IV: **Power Transmissions Systems, Pulleys:** Transmission of power by belt and rope drives, transmission efficiencies, belts – flat and v types – ropes - pulleys for belt and rope drives, materials, chain drives DESIGN OF POWER SCREWS: Design of screw, square ACME, buttress screws, design of nut,	**UNIT-IV:** **Power Transmissions Systems, Pulleys:** Introduction, Belt and rope drives, Selection of belt drives, types of belt drives, Transmission of power by belt and rope drives, Velocity ratio of belt drives, slip of belt, creep of belt, Tension for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, transmission efficiencies, belts flat and V types

	compound screw, differential screw, ball screw- possible failures.	ropes - pulleys for belt and rope drives, materials, chain drives –length, angular speed ratio, classification of chains. Design of Power Screws: Design of screw, square ACME, buttress screws, design of nut, compound screw, differential screw, ball screw possible failures.
	UNIT-V: **Spur & Helical Gear Drives**: Spur gears- helical gears – load concentration factor – dynamic load factor, surface compressive strength – bending strength – design analysis of spur gears – estimation of centre distance, module and face width, check for plastic deformation, check for dynamic and wear considerations.	**UNIT-V:** **Spur & Helical Gear Drives:** Spur gears- helical gears load concentration factor dynamic load factor, surface compressive strength bending strength (lewis equation) design analysis of spur gears estimation of centre distance, module and face width, check for plastic deformation.
	UNIT-VI: **Machine Tool Elements**: Levers and brackets: design of levers – hand levers-foot lever – cranked lever – lever of a lever loaded safety valve- rocker arm straight – angular-design of a crank pin – brackets-hangers- wall boxes. **Wire Ropes:** Construction, Designation, Stresses in wire ropes, rope sheaves and drums.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Automobile Engineering	Automobile Engineering
Course Code	R1642033	171ME5E01
Syllabus	**UNIT-I:** **Introduction:** Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft.	**UNIT-I:** **Introduction:** Components of four wheeler automobile – chassis and body – Chassis Layout - power transmission – rear wheel drive, front wheel drive, 4 wheel drive and Motor Vehicle Act 1988 – Legal Aspects/Compliance of Automotive Vehicles: Introduction to Motor Vehicle Act, Registration of Vehicles, Inspection and Fitness of vehicles and Homologation of Vehicles.
	UNIT-II: **Transmission System**: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box, over drive torque converter. propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.	**UNIT-II:** **Transmission System:** Clutches, principle, types, gear boxes, types, Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles– types **Steering System:** Steering geometry – camber, castor, king pin rake, combined angle toe in, center point steering. Types of steering mechanism –Ackerman steering mechanism, Davis steering mechanism, steering linkages.

	UNIT-III: **Steering System:** Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.	**UNIT-III:** **Suspension System:** Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, independent suspension system, Air Suspension, Rubber Suspension, Hydro elastic suspension system, Hydra gas suspension system **Braking System:** Mechanical braking system, hydraulic braking system requirement of brake fluid, pneumatic and vacuum brakes, Parking Braking system
	UNIT-IV: **Suspension System:** Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, independent suspension system. **Braking System:** Mechanical brake system, hydraulic brake system, master cylinder, wheel cylinder tandem master cylinder requirement of brake fluid, pneumatic and vacuum brakes. **Electrical System:** Charging circuit, generator, current – voltage regulator – starting system, Bendix drive mechanism solenoid switch, lighting systems, horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.	**UNIT-IV:** **Wheels And Tyres:** Basic Requirements of Wheels and Tyres, Construction of Wheel Assembly, Tyre Construction, Types, Tyre Sizes and Designation, Aspect Ratio, Tyre Tread Pattern, Selection of Tyre under Different Applications.
	UNIT-V: **Engine Specification And Safety Systems:** Introduction- engine specifications with regard to power, speed, torque, no. of cylinders and arrangement, lubrication and cooling etc. **Safety:** Introduction, safety systems - seat belt, air bags, bumper, anti-lock brake system (ABS), wind shield, suspension sensors, traction control, mirrors, central locking and electric windows, speed control.	**UNIT-V:** **Electrical System:** Charging circuit, generator, starting system, lighting, horn, wiper, fuel gauge, oil pressure gauge, engine temperature indicator. **Safety Systems:** Introduction, safety systems - seat belt, air bags, bumper, anti-lock brake system (ABS), Electronic Brake force Distribution (EBD), mirrors, central locking, speed control, Retractable Steering system, Head restraints, seats with anti-submarine effects and fuel cut off switch.

	UNIT-VI: **Engine Emission Control:** Introduction – types of pollutants, mechanism of formation, concentration measurement, methods of controlling-engine modification, exhaust gas treatment-thermal and catalytic converters-use of alternative fuels for emission control – National and International pollution standards **Engine Service:** Introduction, service details of engine cylinder head, valves and valve mechanism, piston connecting rod assembly, cylinder block, crank shaft and main bearings, engine reassembly-precautions.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Thermal Engineering Lab	Thermal Engineering Lab
Course Code	R1631038	171ME5L03
	List of Experiments: 1. I.C. Engines valve / port timing diagrams. 2. Testing of Fuels – Viscosity, flash point/fire point, carbon residue, calorific value. 3. I.C. Engines performance test and Exhaust emission measurements (4 -stroke diesel engine) 4. I.C. Engines performance test and Exhaust emission measurements (2-stroke petrol engine) 5. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol engine. 6. Determination of FP by retardation and motoring test on IC engine. 7. I.C. Engines heat balance at different loads and show the heat distribution curve. 8. Economical speed test of an IC engine. 9. Performance test on variable compression ratio engines. 10. Performance test on reciprocating air compressor unit. 11. Dis-assembly / assembly of different parts of two wheelers. 3 wheelers & 4 wheelers. Tractor & Heavyduty engines covering 2-stroke and 4 stroke, SI and CI engines. 12. Study of boilers, mountings and accessories.	**List of Experiments:** 1. Draw the valve and port timing diagrams for four and two stroke engines 2. Evaluate the performance of 4 - stroke Diesel engines. 3. Evaluate the performance of 4 - stroke Petrol engines. 4. Evaluation of frictional power by conducting morse test on 4-stroke multi cylinder petrol engine. 5. Determination of frictional power by retardation and motoring test on IC Engine 6. Draw the heat balance sheet for 4-stroke Single cylinder Diesel / Petrol engines. 7. Draw the heat balance sheet for 4-stroke multi cylinder petrol engine. 8. Calculate the performance of variable compression ratio engines. 9. Performance test on reciprocating air compressor unit. 10. Disassembly / assembly of engines. 11. Determine the flash and fire point of given oil sample. 12. Determination of Viscosity using Red Wood Viscometer. 13. Determination of viscosity using Saybolt Viscometer. 14. Determination of calorific value of fuels by using Bomb Calorimeter.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Metrology	Metrology& Instrumentation
Course Code	R1632031	171ME6T15
Syllabus	**UNIT-I:** **Systems Of Limits And Fits:** Introduction, nominal size, tolerance, limits, deviations, fits -Unilateral and bilateral tolerance system, hole and shaft basis systems-interchangeability, deter mistic & statistical tolerances, selective assembly. International standard system of tolerances, selection of limits and tolerances for correct functioning.	**UNIT-I:** **Linear and Angular Measurements, Limits and Fits:** ISO system: Fits and Types of interchangeability, Taylor's Principle or plain limit gauges, Use of Plug, Ring and Snap gauges. Indicating type limit gauges. Introduction- Linear and Angular measurements - Slip gauges and End bars - Gauge material and manufacturing methods, Different types of Micrometers, Height gauges, Tomlinson gauges. Precision polygon, Sine bar, Auto collimator.
	UNIT-II:. **Linear Measurement:** Length standards, end standards, slip gauges- calibration of the slip gauges, dial indicators, micrometers. **Measurement of Angles and Tapers:** Different methods – bevel protractor, angle slip gauges- angle dekkor- spirit levels- sine bar- sine table, rollers and spheres used to measure angles and tapers. LIMIT GAUGES: Taylor's principle – design of go and no go gauges; plug, ring, snap, gap, taper, profile and position gauges.	**UNIT-II:** **Optical Measurement and Comparators:** Dial indicator, Sigma and Mechanical comparator, Free flow and Back pressure type Pneumatic comparator. Application of set jet gauge heads Optical projector, Chart, screen gauges and measuring methods, Micro gauge bridge lines. Tool maker's Microscope applications, Measurement of Straightness and- Flatness. Roundness measurement with bench centers and talyround, Coordinate Measuring Machine in components geometries.
	UNIT-III: **Optical Measuring Instruments:** Tools maker's microscope and uses - autocollimators, optical projector, optical flats and their uses.	**UNIT-III:** **Surface Roughness Measurements And Gear Tooth Measurement:** Parameters as per ISO indices. Profilometer, Taylor Hobson Talysurf. Application of Thread metrology - 2 wire and 3 Wire methods,

	Interferometry: Interference of light, Michelson's interferometer, NPL flatness interferometer, and NPL gauge interferometer.	**Gear measurement –** Gear tooth thickness, Parkinson gear tester, General geometric tests for testing machine tools- Lathe, drill, mill.
	UNIT-IV: **Surface Roughness Measurement:** Differences between surface roughness and surface waviness – Numerical assessment of surface finish-CLA, Rt., R.M.S. Rz, R10 values, Method of measurement of surface finish – Profilograph, Talysurf, ISI symbols for indication of surface finish. COMPARATORS: Types - mechanical, optical, electrical and electronic, pneumatic comparators and their uses	**UNIT-IV:** **Displacement and Strain Measurement:** Elements of instrumentation system. Static and Dynamic characteristics. Types of errors. Displacement transducers. LVDT. Strain measurement - Wire and foil type resistance strain gauges. Rosette Gauges. Bonding procedure. Lead resistance compensation. Adjacent arm and self-compensating gauges. Proving ring Strain gauge load cells, measurement of axial load and torsion by strain gauges. Piezo electric load cell.
	UNIT-V: **Gear Measurement**: Nomenclature of gear tooth, tooth thickness measurement with gear tooth vernier & flange micro meter, pitch measurement, total composite error and tooth to tooth composite errors, rolling gear tester, involute profile checking. **Screw Thread Measurement:** Elements of measurement – errors in screw threads- concept of virtual effective diameter, measurement of effective diameter, angle of thread and thread pitch, and profile thread gauges.	**UNIT-V:** **Temperature, Pressure and Flow Measurement:** Introduction to Seismic Transducers - displacement and acceleration measurement, Pressure measurement - Bourdon pressure gauge, bulk modulus gauge, pirani gauge, Temperature measurement by thermo couples. Laws of thermo electricity. Types of materials used in thermocouples. Rotameter, magnetic, ultrasonic, turbine flow meter, hot – wire anemometer, laser Doppler anemometer (LDA), dynamometers.
	UNIT-VI: **Flatness Measurement:** Measurement of flatness of surfaces-instruments used- straight edges-surface plates – auto collimator. **Machine Tool Alignment Tests:** Principles of machine tool alignment testing on lathe, drilling and milling machines.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Non-Destructive Evaluation	Non-Destructive Evaluation
Course Code	R164203B	171ME6E06
Syllabus	**UNIT – I** **Introduction to non-destructive testing:** Radiographic test, Sources of X and Gamma Rays and their Interaction with Matter, Radiographic equipment, Radiographic Techniques, Safety Aspects of Industrial Radiography	**UNIT – I** **Introduction to non-destructive testing:** Types of testing, Radiographic test: - Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques. Application of Industrial Radiography, Span of NDE Activities Railways, Nuclear, Non-nuclear, Aerospace Industries, Automotive Industries.
	UNIT – II **Ultrasonic test:** Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect, Ultrasonic Transducers and their Characteristics, Ultrasonic Equipment and Variables Affecting Ultrasonic Test, Ultrasonic Testing, Interpretations and Guidelines for Acceptance, Rejection - Effectiveness and Limitations of Ultrasonic Testing.	**UNIT – II** **Ultrasonic test:** Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect, Ultrasonic Transducers and their Characteristics, Test Equipment, Test Variables, Guidelines for Acceptance and Rejection - Effectiveness and Limitations. Application of Ultrasonic test in Castings, Railways, Nuclear, Non-nuclear & Steel Industries.
	UNIT – III **Liquid Penetrant Test:** Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing **Eddy Current Test:** Principle of Eddy Current, Eddy Current Test System, Applications of Eddy Current Testing Effectiveness of Eddy Current Testing	**UNIT – III** **Liquid Penetrant Test:** Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing. Applications in Aerospace Industries, castings, welded constructions, Pressure vessels.

	UNIT – IV **Magnetic Particle Test:** Magnetic Materials, Magnetization of Materials, Demagnetization of Materials, Principle of Magnetic Particle Test, Magnetic Particle Test Equipment, Magnetic Particle Test Procedure, Standardization and Calibration, Interpretation and Evaluation, Effective Applications and Limitations of the Magnetic Particle Test	**UNIT – IV** **Magnetic Particle Test:** Magnetic Materials, Magnetization of Materials, Demagnetization of Materials, Principle of Magnetic Particle Test and Procedure, Equipment's required, Standardization and Calibration, Interpretation and Evaluation, Advantages and Limitations, Applications of magnetic particle test in Surface detection.
	UNIT – V **Infrared And Thermal Testing:** Introduction and fundamentals to infrared and thermal testing–Heat transfer –Active and passive techniques –Lock in and pulse thermography–Contact and non-contact thermal inspection methods–Heat sensitive paints –Heat sensitive papers –-thermally quenched phosphors liquid crystals – techniques for applying liquid crystals –other temperature sensitive coatings –Inspection methods – Infrared radiation and infrared detectors–thermos mechanical behaviour of materials–IR imaging in aerospace applications, electronic components, Honey comb and sandwich structures–Case studies.	**UNIT – V** **Eddy Current Test:** Principle of Eddy Current, Eddy Current Test System, Eddy Current Testing Effectiveness. Applications in Offshore Gas and Petroleum Projects, Coal Mining Industry, Castings, Railways.
	UNIT – VI **Industrial Applications of NDE:** Span of NDE Activities Railways, Nuclear, Non-nuclear and Chemical Industries, Aircraft and Aerospace Industries, Automotive Industries, Offshore Gas and Petroleum Projects, Coal Mining Industry, NDE of pressure vessels, castings, welded constructions	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Machine Tools Lab	Machine Tools Lab
Course Code	R163107	171ME6L04
Syllabus	**List of Experiments:** 1. Introduction of general purpose machines -lathe, drilling machine, milling machine, shaper, planing 2. machine, slotting machine, cylindrical grinder, surface grinder and tool and cutter grinder. 3. Step turning and taper turning on lathe machine 4. Thread cutting and knurling on lathe machine. 5. Drilling and tapping 6. Shaping and planning 7. Slotting 8. Milling 9. Cylindrical surface grinding 10. Grinding of tool angles.	**List of Experiments:** 1. Introduction of general purpose machine Lathe, Drilling, Milling, Shaper 2. Step turning and taper turning using lathe. 3. Thread cutting and knurling using Lathe machine 4. Drilling and Tapping using Drilling Machine. 5. Shaping of V groove using Shaper. 6. Slotting of a keyway using Slotter. 7. Cutting spur gear using Milling Machine 8. Grinding of Flat surfaces using Surface Grinding Machine 9. Gang Milling on Milling machine 10. Grinding of HSS Tool using Tool and Cutter grinder
		List of Augmented Experiments: 1. Introduction to CNC Machines 2. Eccentric on Lathe 3. Drilling, Boring and internal threading on Lathe

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Metrology& Instrumentation Lab	Metrology/Instrumentation Lab
Course Code	R1632037	171ME6L06
Syllabus	**List of Experiments** **Metrology Lab** 1. Measurement of lengths, heights, diameters by vernier calipers, micrometers etc. 2. Measurement of bores by internal micrometers and dial bore indicators. 3. Use of gear tooth vernier caliper for tooth thickness inspection and flange micro meter for checking the 4. chordal thickness of spur gear. 5. Machine tool alignment test on the lathe. 6. Machine tool alignment test on drilling machine. 7. Machine tool alignment test on milling machine. 8. Angle and taper measurements with bevel protractor, Sine bar, rollers and balls. 9. Use of spirit level in finding the straightness of a bed and flatness of a surface. 10. Thread inspection with two wire/ three wire method & tool makers microscope. 11. Surface roughness measurement with roughness measuring instrument.	**List of Experiments** **Metrology Lab** 1. Measurement of lengths, heights, diameters by vernier calipers, micrometers. 2. Angle and taper measurements with bevel protractor, Sine bar, rollers and balls. 3. Measurement of bores by internal micrometers and dial bore indicators. 4. Straightness measuring using autocollimator. 5. Gear tooth thickness measurement using gear tooth vernier calipers.
	Instrumentation Lab 1. Calibration of pressure gauge. 2. Calibration of transducer for temperature measurement. 3. Study and calibration of LVDT transducer for displacement measurement. 4. Calibration of strain gauge. 5. Calibration of thermocouple. 6. Calibration of capacitive transducer.	**Instrumentation Lab** 1. Calibration of pressure gauge. 2. Study and calibration of LVDT transducer for displacement measurement. 3. Calibration of thermocouple. 4. Study and calibration of photo and magnetic speed pickups. 5. Calibration of resistance temperature detector.

	7. Study and calibration of photo and magnetic speed pickups. 8. Calibration of resistance temperature detector. 9. Study and calibration of a rotameter. 10. Study and use of a seismic pickup for the measurement of vibration amplitude of an engine bed at various loads. 11. Study and calibration of Mcleod gauge for low pressure.	
		List of Augmented Experiments: 1. Flatness measurement using optical flat: 2. Machine tool alignment test on lathe using various metrology instruments.
		List of Augmented Experiments: 1. Calibration of Force measuring setup 2. Study and calibration of a Rotameter for flow measurement.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Simulation Lab	CAD/CAM Lab
Course Code	RT4103L	R16421037
Syllabus	**List of Experiments:** 1. **Drafting:** Development of part drawings for various components in the form of orthographic and isometric representation of dimensioning and tolerances scanning and plotting. study of script, DXE and IGES files.	**List of Experiments:** 1. **Drafting:** Development of part drawings for various components in the form of orthographic and isometric representation of dimensioning and tolerances scanning and plotting. study of script, DXE and IGES files.
	2. **Part Modeling:** Generation of various 3D models through protrusion, revolve, shell sweep. creation of various features. study of parent child relation. feature based and boolean based modelling surface and assembly modelling. study of various standard translators. design simple components.	2. **Part Modeling:** Generation of various 3D models through protrusion, revolve, shell sweep. creation of various features. study of parent child relation. feature based and boolean based modelling surface and assembly modelling. study of various standard translators. design simple components.
	3. a. Determination of deflection and stresses in 2D and 3D trusses and beams. b. Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components. c. Determination of stresses in 3D and shell structures (at least one example in each case) d. Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam. e. Steady state heat transfer Analysis of plane and Axisymmetric components.	3. a. Determination of deflection and stresses in 2D and 3D trusses and beams. b. Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components. c. Determination of stresses in 3D and shell structures (at least one example in each case) d. Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam. e. Steady state heat transfer Analysis of plane and Axisymmetric components.

	4. a. Development of process sheets for various components based on b. tooling Machines. c. Development of manufacturing and tool management systems. d. Study of various post processors used in NC Machines. e. Development of NC code for free form and sculptured surfaces using CAM packages. f. Machining of simple components on NC lathe and Mill by transferring g. NC Code / from a CAM package. Through RS 232. h. Quality Control and inspection.	4. a. Study of various post processors used in NC Machines. b. Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS 232. c. Practice on CNC Sinutrain Turning d. Practice on CNC Sinutrain Milling e. CNC programming for turned components using FANUC Controller f. CNC programming for milled components using FANUC Controller g. Automated CNC Tool path & G-Code generation using Pro/E/MasterCAM

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Syllabus revision Index

2019-20

S.No	Name of the course	Percentage of syllabus change
1	Communicative English	90
2	Differential Equations and Linear Algebra	20
3	Applied Physics	40
4	Programming for Problem Solving Using C	20
5	Applied Physics Lab	60
6	Programming for Problem Solving Using C Lab	35
7	Basic Engineering Workshop	50
8	Environmental Science	33
9	Transform Techniques	60
10	Engineering Chemistry	80
11	Engineering Graphics and Design	55
12	Basic Electrical Engineering	60
13	Engineering Chemistry Lab	50
14	Computer Architecture and Organization	35
15	VLSI Design	32
16	VLSI lab	66.6
17	Digital Communications Lab	20
18	Digital Image Processing	50
19	Digital Signal Processing Lab	60

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)-Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04/171BS2T04	191BS1T03/191BS2T07
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer.	UNIT-I Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes	UNIT-II Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P. Thomson experiment – Heisenberg's Uncertainity Principle –Interpretation of wave function – Schrödinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism – Quarter wave plate and Half Wave plate- working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition Probabilities Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser- Applications	. UNIT-III Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi Dirac distribution function - expression for Fermi energy -Density of states. BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy

		bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: Quantum Mechanics: Introduction –Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy..	UNIT-IV Semiconductor Physics: Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & ntype - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: Band Theory of Solids: Bloch's theorem (qualitative) – Kronig – Penney model (Qualitative) – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. Semiconductor Physics: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.–	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius- Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	COMPUTER PROGRAMMING	PROGRAMMING FOR PROBLEM SOLVING USING C
Course Code	171ES1T01	191ES1T01
Syllabus	**UNIT-I:** **Computer History, Hardware, Software, Programming Languages and Algorithms:** Fundamental concepts of Computer, Programming Languages - Machine Language, Assembly Language, Low-level and High-level Languages, Basics of Hardware and Software, Algorithms, Flowchart, pseudo code, The Software Development Process. **Introduction to C Programming**: Introduction, Structure of a C Program, Identifiers, main() function, printf() function, Indentation, Comments, Keywords, Data Types, Variables, Constants and Declarations, Input/ Output Statements, Operators, Type Conversion.	**UNIT-I** **Computer History, Hardware, Software, Programming Languages and Algorithms:** Components and functions of a Computer System, Concept of Hardware and Software Programming Languages: Low-level and High-level Languages, Program Design Tools: Algorithm, Flowchart, Pseudo code. **Introduction to C Programming:** Introduction, Structure of a C Program, Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/Output Statements, Operators, Type Conversion.
	UNIT -II: **Control Flow, Relational Expressions &Arrays:** Selection: if, if-else, nested if with examples, Multi-way selection: switch, else-if with examples. Repetition: Basic Loop Structures: for, while and do-while loops, counter controlled and condition controlled loops, nested loops, goto, continue and break. **Arrays:** Introduction, Operations on Arrays, 2D Arrays, Arrays as Function	**UNIT -II** **Control Flow, Relational Expressions & Arrays:** Conditional Branching Statements: if, if-else, if-else–if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, go to statement. **Arrays:** Introduction, Operations on Arrays, One dimensional Array, Two dimensional Array, Multi dimensional arrays.

	Arguments, Multi Dimensional Arrays.	
	UNIT-III: **Functions:** Basics of Functions: Declaration, Definition and call, Categories of Functions, passing parameters to Functions, Variable Scope, Storage Classes, Recursive Functions, Recursion and its Types. **Strings:** String Fundamentals, String Processing with and without Library Functions.	**UNIT-III** **Strings:** String Fundamentals, String Processing with and without Library Functions. **Functions:** Introduction, Function Declaration, Function Definition, Function call, Categories of Functions, passing parameters to Functions, Arrays as Function Arguments, Scope of Variables, Variable Storage Classes,Recursion.
	UNIT-IV: **Pointers:** Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function arguments, Pointer to Pointer, Pointers and Arrays, Pointers and Strings, Dynamic Memory Allocation Functions, Dangling Pointer, Command line Arguments.	**UNIT-IV** **Pointers:** Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function arguments, Pointers and Arrays, Pointers and Strings, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command line Arguments.
	UNIT-V: **Structures:** Introduction to Structures, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, derived data type, bit-fields. **Data Files:** Introduction to Files, Using Files in C, Reading and Writing with Text Files, Error Handling during File Operations, Random File Access.	**UNIT-V** **Structures, Unions, Bit Fields:** Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type –enum variables, Using Typedef keyword, Bit Fields. **Data Files:** Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Applied Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L03/191BS2L05
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Newton's rings – Radius of Curvature of Plano - Convex Lens
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Energy Band gap of a Semiconductor p - n junction
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6. Characteristics of Thermistor – Temperature Coefficients
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Determination of dielectric constant by charging and discharging method
	8. Determination of velocity of sound – Volume Resonator.	8. Determination of resistivity of semiconductor by Four probe method
	. 9. L- C- R Series Resonance Circuit.	. 9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	10. Study of I/V Characteristics of Semiconductor diode.	10. Measurement of magnetic susceptibility by Quincke's method
	11. I/V characteristics of Zener diode.	11. Dispersive power of diffraction grating.
	12. Characteristics of Thermistor – Temperature Coefficients	12. Resolving Power of telescope
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Resolving power of grating
	14. Energy Band gap of a Semiconductor p -	14. Determination of Hall voltage and Hall

	n junction.	coefficients of a given semiconductor using Hall-effect.
	15. Hall Effect in semiconductors.	15. Variation of dielectric constant with temperature
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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Signature of the HOD

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**COMPUTER PROGRAMMING LAB**	Programming for Problem Solving Using C Lab
Course Code	171ES1L01	191ES1L01
	Exercise – 1: **Introduction to C Programming** 1.1) Introduction about Editors – Turbo, vi, Emacs 1.2) C Program to Perform Addition, Subtraction, Multiplication and Division of two numbers from Command line 1.3) Write a C Program to Calculate area of a Triangle using Heron's formula. **Exercise – 2:** **Basic Math** 2.1) Write a C Program to Find Whether the Given Year is a Leap Year or not. 2.2) Write a C Program to convert Celsius to Fahrenheit and vice versa. 2.3) Write a C Program to find largest of three numbers using ternary operator. **Exercise – 3:** **Control Flow - I** 3.1) Write a C program to find the roots of a Quadratic Equation. 3.2) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case. 3.3) Scenario - 1 ATM PIN GENERATION: Aditya purchased a credit card. He has to generate a PIN number to access the ATM and Net banking for which OTP	**1. Introduction to C Programming** 1.1) Basic Linux Commands 1.2) Exposure to Turbo C, Vi, Emacs, Code Blocks IDE, Dev C++ 1.3) Writing simple programs using printf(), scanf() **2. Raptor** 2.1) Installation and Introduction to Raptor. 2.2) Draw a flow chart to find the Sum of 2 numbers. 2.3) Draw a flow chart to find Simple interest. **For the following experiments, develop flow charts using Raptor and implement C programs to:** **3. Basic Math** 3.1) Convert Celsius to Fahrenheit and vice versa. 3.2) Find largest of three numbers using ternary operator. 3.3) Calculate area of a Triangle using Heron's formula. **4. Control Flow- I** 4.1) Find Whether the Given Year is a Leap Year or not. 4.2) Find the roots of a Quadratic Equation. 4.3) Make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case. **5. Control Flow- II** 5.1) Find Whether the Given Number is

	was sent to his registered mobile number. Using this OTP number he has to generate ATM PIN number. After generating PIN number, he can use it for further transactions. Maximum login he can make is 3 times. Sample Input: OTP: 6732 If valid Enter PIN: 8858 Confirm your PIN: 8858 Sample output: valid/Invalid PIN generated successfully. Note: OTP is hard coded. 3.4) Scenario - 2 RESET PASSWORD: Sindhuja was using Syndicate Bank's Online Account. She wanted to pay her bills through Online. But she forget her password. Now she has to reset the password. For resetting the password, she has to select reset option from the Menu. NOTE: using switch case. Sample input: 1. Fast withdrawal 2. Mini Statement. 3. Balance Enquiry 4. Reset Password Enter your choice: 4 Sample Output: Reset password: New password: ***** Confirm password: ***** **Exercise –4:** **Control Flow - II** 4.1) Write a C Program to Find Whether the Given Number is i) Prime Number ii) Armstrong Number 4.2) Write a C program to print Floyd Triangle 4.3) Write a C Program to print Pascal Triangle **Exercise – 5:**	Prime number or not 5.2) Find Whether the Given Number is Armstrong Number or not. 5.3) Print Floyd Triangle. **6. Control Flow- III** 6.1) Find the sum of individual digits of a positive integer. 6.2) Check whether given number is palindrome or not. 6.3) Read two numbers, x and n, and then compute the sum of the geometric progression 1+x+x2 +x3 +……+xn. **7. Arrays** 7.1) Search an element in the given array (Linear Search) 7.2) Perform matrix addition. 7.3) Perform matrix multiplication. **8. Strings** 8.1) Implementation of string manipulation operations with library function. a) copy b) concatenate c) length d) compare 8.2) Implementation of string manipulation operations without library function. a) copy b) concatenate c) length d) compare 8.3) Verify whether the given string is a palindrome or not **9. Functions, Array & Pointers** 9.1) Demonstrate parameter passing in Functions. 9.2) Find Fibonacci, Factorial of a number with Recursion and without Recursion. 9.3) Find the sum of given numbers with arrays and pointers. **10. Pointers** 10.1) Perform Addition, Subtraction,

Control Flow – III

5.1) Write a C program to find the sum of individual digits of a positive integer.

5.2) Write a C program to check whether given number is palindrome or not.

5.3) Write a C program to read two numbers, x and n, and then compute the sum of the geometric progression 1+x+x2 +x3 +……+xn.

5.4) Scenario - 3 Student Attendance report Generation:

Some of the school staff had failed to maintain the attendance of the students, causing lack of essential records related to students attendance that should be submitted in a parents meet. The school management has decided to automate the process in order to maintain the attendance of every student effectively. You are asked to write a program to the above scenario and display whether the student is allowed to write the Exam or not.

percentage<65	detained
>=65 and <75	should pay condonation to appear for Exams
>=75	allowed for Exams

Exercise 6:

Arrays

Demonstration of arrays

6.1) Linear Search.

6.2) Bubble Sort.

6.3) Operations on Matrix.

6.4) Scenario – 4 Celebrity of the Week:

Red FM has launched a program Multiplication and Division of two numbers using Command line arguments.

10.2) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

10.3) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

11. Structures

11.1) Store Information of a book Using Structure

11.2) Add Two Complex Numbers by Passing Structure to a Function

12. Files

12.1) Open a file and to print the contents of the file on screen.

12.2) Copy content of one file to another file.

12.3) Merge two files and store content in another file.

LIST OF AUGMENTED EXPERIMENTS:

13 to 16 (Any 2 of the following experiments can be performed)

13. Atm Pin Generation:

Aditya purchased a credit card. He has to generate a PIN number to access the ATM and Net banking for which OTP was sent to his registered mobile number. Using this OTP number he has to generate ATM PIN number. After generating PIN number, he can use it for further transactions. Maximum login he can make is 3 times.

Sample Input:

OTP: 6732

If valid

Enter PIN: 8858

Confirm your PIN: 8858

output:

valid/Invalid

PIN generated successfully.

Note: OTP is hard coded.

called Celebrity of the week in their channel. Listeners are given a toll free number where they can listen to list of celebrities. Listeners can choose their favourite celebrity from the list and vote for him/her. The votes are validated from Monday to Saturday. The one with highest votes is called as "Celebrity of the Week" and his/her songs are played in the program, which is aired on Sundays. Now write a program to find the celebrity of the week.

Exercise – 7:

Functions

7.1) Write a C Program to demonstrate parameter passing in Functions and returning values.

7.2) Write a C Program to find Fibonacci, Factorial of a number with Recursion and without Recursion.

7.3) Scenario – 5 SELF DRIVE RENTAL

Sadiq and his friends are going to Banglore. But they don't have a vehicle in Banglore. For that they go to rental cars to take car for rent. You have find out what is total amount of car's rent. The car's rentals and rules are as follows.

i) Minimum booking is 4.

ii) There are 3 types of cars

A) SWIFT

B) SCORPIO

C) INNOVA

iii) There are 3 categories in cars rental

A) LTTE

B) CLASS

C) XL

FOR SWIFT,

- • In LTTE 5 kms are free for one hour and Rs.70 per one hour, if they exceed 5kmph, then Rs.12 per km.
- • In CLASS, 10 kms are free

14. Reset Password:

Aditya was using Syndicate Bank's Online Account. She wanted to pay her bills through Online. But she forgets her password. Now she has to reset the password. For resetting the password, she has to select reset option from the Menu.

NOTE: using switch case.

Sample input:

Fast withdrawal

Mini Statement

Balance Enquiry

Reset Password Enter your choice: 4

Sample Output:

Reset password: New password: *****

Confirm password: *****

15. Student Attendance Report Generation:

Some of the school staff had failed to maintain the attendance of the students, causing lack of essential records related to students attendance that should be submitted in a parents meet. The school management has decided to automate the process in order to maintain the attendance of every student effectively. You are asked to write a program to the above scenario and display whether the student is allowed to write the Exam or not.

Percentage<65	Detained
>=65 and <75	should pay condonation to appear for Exams
>=75	Allowed for

	for one hour and Rs.90 per one hour, if they exceed 10kmph, then Rs.12 per km. • • In XL, 15 kms are free for one hour and Rs.110 per one hour, if they exceed 15kmph, then Rs.12 per km. FOR SCORPIO, • • In LTTE, 5 kms are free for one hour and Rs.90 per one hour, if they exceed 5kmph, then Rs.15 per km. • • In CLASS, 10 kms are free for one hour and Rs.110 per one hour, if they exceed 10kmph, then Rs.15 per km. • • In XL, 15 kms are free for one hour and Rs.130 per one hour, if they exceed 15kmph, then Rs.15 per km. FOR INNOVA • • In LTTE, 5 kms are free for one hour and Rs.110 per one hour, if they exceed 5kmph, then Rs.18 per km. • • In CLASS, 10 kms are free for one hour and Rs.130 per one hour, if they exceed 10kmph, then Rs.18 per km. • • In XL, 15 kms are free for one hour and Rs.150 per one hour, if they exceed 15kmph, then Rs.18 per km. **Exercise – 8:** **Strings** 8.1) Implementation of string manipulation operations with library function. i) copy ii) concatenate iii) length iv) compare 8.2) Implementation of string manipulation operations without library function.	exams **16. Library Management** Shilpa is a student of PGEC got the Library Card. She wants to lend the books from the Library. The college gave two cards to each and every student. The students can lend only two books at a time and it has to be returned back after 15 days. If the books are not returned late fee will be collected for no. of days the books were returned after the due date. Late fee per day is Rs.50/- Sample output: Enter the name of student: nalini Enter the Roll No.:555 Enter the branch: cse Enter the section: A Enter the year: 3 Enter the Date of Lend (dd mm yyyy) : 08 08 2017 Enter the Date of return (dd mm yyyy): 09 10 2017 The no. of days book used by the student = 62 Extra days used by the student = 47 Late return fine fee = 2350

	i) copy ii) concatenate iii) length iv) compare 8.3) Verify whether the given string is a palindrome or not 8.4) Scenario – 6 Word with Obesity: Jeeth is a fun loving and active boy. He likes to play with words and numbers. One day Jeeth and his friends attended a seminar, which was conducted in his school. The Seminar was about "Causes of obesity in children and its effects". Jeeth and his friend Ram are not interested in listening to the seminar, so he thought of giving a puzzle to Ram. Jeeth gave some words to Ram and wanted him to find the word with Obesity. Ram was confused and asking your help. Write a program to find the weights of the words and display the word with highest weight (word with obesity). Sample Input: Enter no of words: 3 Enter 3 words: apple banana carrot Sample Output: Word with Obesity is carrot **Exercise – 9:** **Arrays and Pointers** 9.1) Write a C Program to Access Elements of an Array Using Pointer 9.2) Write a C Program to find the sum of numbers with arrays and pointers. **Exercise – 10:** **Dynamic Memory Allocations** 10.1) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function. 10.2)Write a C program to find sum of n elements entered by user. To perform this program, allocate	

	memory dynamically using calloc () function. Understand the difference between the above two programs **Exercises – 11:** **Structures** 11.1) Write a C Program to Store Information of a book Using Structure 11.2) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation 11.3) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function 11.4) Scenario – 7 Library Management Shilpa student of PGEC got the Library Card. She wants to lend the books from the Library. The college gave two cards to each and every student. The students can lend only two books at a time and it has to be returned back after 15 days. If the books are not returned late fee will be collected for no. of days the books were returned after the due date. Late fee per day is Rs.50/- Sample Input. Enter the name of student, Roll No. Branch, Section, Year, DOL, DOR, Sample output No. of days returned after the due date = 5 Late fee per day = Rs. 50 Fine paid by the student is 5 * 50 =250. **Exercise -12:** **Files** 12.1) Write a C program to open a file and to print the contents of the file on screen. 12.2) Write a C program to copy content of one file to another file. 12.3) Write a C program to merge two files and store content in another file. 12.4) Scenario – 8 Student Information System Using Files:	

	Lakshya International school was recently established and having large no of admissions. The school management wanted the Student information to be computerized and wanted to maintain in a simple and in effective manner. You are asked to develop Student Information System using Files to perform the following tasks 1. Add New Student 2. Update Existing Student 3. Delete Existing Student 4. Retrieve A Particular/All Students Sample Input: Choose the task you want to perform: 1. Add 2. Update 3. Delete 4. Retrieve Your choice: 1 Enter student details: Name: Akhil Age: 5 Class: 1 Sample Output: Student details added	

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	engineering workshop &it workshop	basic engineering workshop
Course Code	**171ES2L02**	**191ES1L02**
Syllabus	**Trade:** **Carpentry:** 1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint **Fitting:** 1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit **Black Smithy:** 1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt **House Wiring:** 1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance **Tin Smithy:** 1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel	**List of Experiments:** **Carpentry:** 1. Cross Lap Joint 2. Dovetail Joint 3. T - Joint **Fitting:** 4. Vee Fit 5. Square Fit **House Wiring:** 6. Parallel Connection of three bulbs 7. Series Connection of three bulbs **Tin Smithy:** 8. Taper Tray 9. Funnel 10. Plain Pipe **List of Augmented Experiments:** (Student can perform any one of the following experiments) 1. Stair Case wiring 2. Florescent Lamp Fitting
	IT WORKSHOP: **Exercise 1: Identification of peripherals of a computer** Block diagram of the CPU along with the configuration of the each peripheral and its functions.	

	Exercise 2: System Assembling and Disassembling Disassembling the components of a PC and assemble them back to working condition. **Exercise 3: Installation of softwares** Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools. **Exercise 4:Troubleshooting (Demonstration)** Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues. **Exercise 5:Network Configuration and Internet** Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web-Search Engines, Types of search engines, netiquette, cyber hygiene. **Exercise 6: MS-Office / Open Office** a. Word - Formatting, Page Borders, Reviewing, Equations, symbols. b. Spread Sheet - organize data, usage of formula, graphs and charts. c. Power point - features of power point, guidelines for preparing an effective Presentation. d. Access- creation of database, validate data. **Exercise 7:LaTeX** LaTeX - basic formatting, handling equations and images.	

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure- Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social- Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-II	Transform Techniques
Course Code	171BS2T02	191BS2T08
Syllabus	UNIT I: Solution of Algebraic and Transcendental Equations and Interpolation: Introduction- Bisection method – Method of false position – Iteration method – Newton - Raphson method.Errors in polynomial interpolation – Finite differences- Forward differences-Backward differences –Central differences – Relation between operators - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.	UNIT I Laplace Transforms:Laplace transforms of standard functions, First Shifting theorem, Change of scale, Multiplication with t, Division by t, Transforms of derivatives and integrals, Unit step function, Dirac delta function, Periodic function, Evaluating improper integrals by using Laplace Transform.
	UNIT II: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series-Picard's method of successive approximations-Euler's method, Modified Euler's method – Runge - Kutta method (fourth order).	UNITII Inverse Laplace Transforms:Inverse Laplace transforms, Convolution theorem (without proof), Second shifting theorem, Solving differential equations and integro-differential equations using Laplace transforms, **(SCILAB Exercise: Computing Laplace transform of f(t) using symbolic toolbox, Solving initial value problems)
	UNIT III: Fourier Series: Fourier series of periodic function - Dirichlet's conditions for Fourier expansion - Functions having points of discontinuities–Change of interval – Even and odd functions – Half-range series.	UNIT III Fourier Series:Fourier series of periodic function, Dirichlet's conditions for Fourier expansion, Functions having points of discontinuities, Change of interval, Even and odd functions, Half-range series.
	UNIT IV: Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.	UNIT IV Fourier Transforms:Fourier integral theorem (without proof), Fourier sine and cosine integrals, Fourier Transforms, Fourier sine and cosine transforms, properties, inverse transforms, Finite Fourier transforms
	UNIT V: Applications of Partial Differential	UNIT-V Z-Transforms:Introduction to power

	Equations: Classification of Higher order P.D.E - Method of separation of Variables- Solution of One dimensional Wave equation, Heat equation and two-dimensional Laplace equation.	series, Definition of Z-transform, Properties, Damping rule, Shifting rule, Initial and final value theorem, Inverse z-transform, Convolution theorem (without proof), Solution of Difference equation by using z-transforms.

N. Sujatha

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Chemistry	Engineering Chemistry
Course Code	171BS1T05/171BS2T05	191BS1T04/191BS2T09
Syllabus	UNIT - I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques)- Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels— Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode, Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	Unit-III Polymer Chemistry: Introduction to polymers, functionality of monomers, chain

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PE,PVC, Bakelite, Teflon and Nylon-6, 6. Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors: -Type –I, Type II – Characteristics and applications Semiconductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis: -Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV Energy Sources And Applications: Introduction- sources of renewable energy –Hydro power, Biomass and Bio-fuels Solar energy – Introduction - Physical and Chemical properties of Silicon- Preparation of Semi-conductors - Doping of Silicon- p and n type semi-conductors PV cell / solar cell- Working & Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique-applications of solar energy. Fuels: Introduction- classification-liquid fuels- Refining of petroleum-cracking-Reforming Gaseous fuels-LPG & CNG Applications.
	UNIT - V: Non-Conventional Energy Sources: Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance Non-conventional energy sources: (i) Hydropower include setup a hydropower plant (schematic diagram) (ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant (iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level. (iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open	UNIT - V Material Science And Engineering: Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM). NanoTubes: Carbon nano tubes- Types of CNT's-preparation methods –Arc discharge, Laser abiliation and chemical vapour deposition – properties and applications. Green Chemistry: Introduction, priniciples of green chemistry (Ex: Solvent, Catalyst, Reactant) Band Theory of Solids:

	cycle OTEC, hybrid OTEC, schematic diagram and explanation. (v) Biomass and biofuels.	Introduction –Explanation of conductors, semi conductors, Insulators by Band Theory- Super conductors-Types-Preparation-Properties and Applications. Appendix: Introduction to Molecular Machines and Molecular Switches

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Drawing**	**Engineering Graphics and Design**
Course Code	**171ES2T03**	**191ES2T02**
Syllabus	**UNIT-I:** **Introduction to Engineering Drawing:** Lettering, Dimensioning, Types of lines. **Geometrical Constructions:** Construction of regular polygons by general method and inscribing circle method. Special methods for pentagon and hexagon. **Conic Sections:** Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods. **Scales:** Plain Scale, Diagonal Scale and Vernier Scales.	**Unit-I:** **Introduction to Engineering graphics:** Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes
	UNIT-II: **Orthographic Projections:** Introduction to orthographic projections, Projections of Points, Projections of Lines.	**UNIT-II:** **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.
	UNIT-III: **Projections of Planes:** Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.	**UNIT-III:** **Projections of solids:** Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.
	UNIT-IV: **Projections of Solids:** Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.	**UNIT-IV:** **Computer Aided Drafting** **Introduction to Computer Aided Drafting:** Basic drawing and editing commands- Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

	UNIT-V: **Isometric Projections** Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.	**UNIT-V:** **Isometric Projections:** Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	ELECTRICAL & MECHANICAL TECHNOLOGY	Basic Electrical Engineering
Course Code	171ES2T06	191ES2T07
Syllabus	**UNIT – I:** **DC Machines:** Principle of operation of DC generator – emf equation – types of DC machine – torque equation of DC motor –applications – three point starter, speed control methods – OCC of DC generator Transformers: Principle of operation of single phase transformers – e.m.f equation – losses –efficiency and regulation.	**UNIT- I** **Dc Generators:** Principle of operation and construction of DC generators – EMF equation – types of generators – magnetization and load characteristics of DC generators.
	UNIT – II: **AC Rotating Machines:** Principle of operation of alternators – regulation by synchronous impedance method – principle of operation of 3-Phase induction motor – slip-torque characteristics - efficiency – applications	**UNIT- II** **Dc Motors:** Principle of operation and construction of DC Motors – types of DC Motors – Characteristics of DC motors – basic starting methods for DC shunt motor – losses and efficiency – Swinburne's test – speed control of DC shunt motor – flux and Armature voltage control methods.

	UNIT – III: **Measuring Instruments:** Classification – Deflection, controlling, damping torque, ammeter, voltmeter, wattmeter, MI, MC instruments –Energy meter – Construction of CRO.	**UNIT- III** **Transformers:** Principle of operation of single phase transformer – types – constructional features – phasor diagram on no-load and load – equivalent circuit, losses and efficiency of transformer – regulation of transformer – OC and SC tests – predetermination of efficiency and regulation.
	UNIT – IV: **Energy Sources:** Renewable and nonrenewable energy resources, renewable energy forms and conversions. Thermodynamic principles and laws. Internal combustion engines: classification – working principle - engine components. Four stroke and two stroke petrol and diesel engines, comparisons. Heat Transfer: Modes of heat transfer- Conduction, Convection, Radiation.	**UNIT- IV** **Three Phase Induction Machine:** Principle of operation and construction of three- phase induction motors –slip ring and squirrel cage motors – slip-torque characteristics, Losses,efficiency calculation – starting methods.
	UNIT – V: **Transmission of power & manufacturing methods:** Belt, rope and chain drives- Different types - power transmission by belts and ropes, initial tensions in the belt. Gears: classification of gears, applications. Metal joining: arc welding, resistance welding, gas welding, brazing and soldering. Metal forming: forging – operations, rolling and extrusion principles. Machine tool: lathe classification, specifications, and operations.	**UNIT- V** **Single Phase Machine & Special Machines:** Principle Of Operation And Construction – Single Phase Induction Motor – Shaded Pole Motors, Capacitor Motors, Universal Motor, Reluctance Motor.

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Computer Architecture and Organization	Computer Architecture and Organization
Course Code	R1631041	171EC5E01
	UNIT -I: **Basic Structure Of Computers:** Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.	**UNIT I:** **Basic Structure of Computers:** Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance. Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating point Arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.
	UNIT-II: **Machine Instruction and Programs:** Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions	**UNIT II:** **Register Transfer Language and Micro-Operations:** Register Transfer language. Register Transfer, Bus and memory Transfer, Types of Microoperations, Arithmetic logic shift unit, Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory Reference Instructions, Input Output and Interrupt
	UNIT -III: **Type of Instructions:** Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations	**UNIT III:** **central Processing Unit:** Stack organization, Instruction formats, Addressing modes, Data Transfer and manipulation, Program control, Reduced Instruction Set Computer (RISC). Micro Programmed Control: Control memory, Address sequencing, Micro program example, Design of

		control unit-Hard wired control, Micro programmed control
	UNIT -IV: **INPUT/OUTPUT ORGANIZATION:** Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)	**UNIT IV:** **The Memory System:** Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data Transfer Modes, Priority Interrupt, Direct Memory Access (DMA), Input –Output Processor (IOP)
	UNIT -V: **The MEMORY SYSTEMS:** Basic memory circuits, Memory System Consideration, Read-Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, INTERLEAVING Secondary Storage: Magnetic Hard Disks, Optical Disks,	**UNIT V:** **Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence.
	UNIT -VI: **Processing Unit:** Fundamental Concepts: Register Transfers, Performing An Arithmetic Or Logic Operation, Fetching A Word From Memory, Execution of Complete Instruction, Hardwired Control, Micro programmed Control: Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next –Address Field	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**VLSI Design**	**VLSI Design**
Course Code	**R1632043**	**171EC6T14**
Syllabus	**UNIT-I:** **Introduction and Basic Electrical Properties of MOS Circuits:** Introduction to IC technology, Fabrication process: nMOS, pMOS and CMOS. Ids versus Vds Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans, Output Conductance and Figure of Merit. nMOS Inverter, Pull-up to Pull-down Ratio for nMOS inverter driven by another nMOS inverter, and through one or more pass transistors. Alternative forms of pull-up, The CMOS Inverter, Latch-up in CMOS circuits, Bi-CMOS Inverter, Comparison between CMOS and BiCMOS technology.	**UNIT I:** **Introduction:** Introduction to IC Technology, MOS and related VLSI Technology, Basic MOS Transistors, Enhancement and Depletion modes of transistor action, IC production process, MOS and CMOS Fabrication processes, BiCMOS Technology, Comparison between CMOS and Bipolar technologies
	UNIT-II: **MOS and Bi-CMOS Circuit Design Processes:** MOS Layers, Stick Diagrams, Design Rules and Layout, General observations on the Design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µm Double Metal, Double Poly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOSinverter,SymbolicDiagramsTranslation to Mask Form	**UNIT II:** **Basic Electrical Properties of MOS and Bi-CMOS Circuits:** Ids versus VdsRelationships, Aspects of MOS transistor Threshold Voltage, MOS transistorTrans, Output Conductance and Figure of Merit. The Pass transistor, NMOSInverter, Pull-up to Pull-down Ratio for NMOS inverter driven by anotherNMOS inverter. Alternative forms of pull-up, The CMOS Inverter, MOStransistor circuit model, BiCMOS Inverter, Latch-up in

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		CMOS circuits andBiCMOS Latch-up Susceptibility
	UNIT-III: **Basic Circuit Concepts:** Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, Some area Capacitance Calculations, The Delay Unit, Inverter Delays, Driving large capacitive loads, Propagation Delays, Wiring Capacitances, Choice of layers. Scaling of MOS Circuits: Scaling models and scaling factors, Scaling factors for device parameters, Limitations of scaling, Limits due to sub threshold currents, Limits on logic levels and supply voltage due to noise and current density. Switch logic, Gate logic.	**UNIT III:** **MOS and Bi-CMOS Circuit Design Processes:** MOS Layers, StickDiagrams, Design Rules and Layout, General observations of design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µmDouble Metal, Double Poly CMOS rules, Layout Diagrams of NAND andNOR gates and CMOS inverter, Symbolic Diagrams-Translation to MaskForm. **Basic Circuit Concepts**: Sheet Resistance, Sheet Resistance concept appliedtoMOStransistors and Inverters, Area Capacitance of Layers, Standard unitof capacitance, The Delay Unit, Inverter Delays, Propagation Delays, WiringCapacitances, Fan-in and fan-out characteristics, Choice of layers, Transistorswitches, Realization of gates using NMOS, PMOS and CMOS technologies.
	UNIT-IV: **Chip Input and Output circuits:** ESD Protection, Input Circuits, Output Circuits and L(di/dt) Noise, On-Chip clock Generation and Distribution. Design for Testability: Fault types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based Techniques and Built-In Self Test techniques.	**UNIT IV:** **Scaling of MOS Circuits:** Scaling models, Scaling factors for deviceparameters, Limits due to sub threshold currents, current density limits onlogic levels and supply voltage due to noise. Subsystem Design: Architectural issues, switch logic, Gate logic, examples of structured design, clocked sequential circuits, system considerations, general considerations of subsystem design processes, an illustration of design processes.

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	UNIT-V: **FPGA Design:** FPGA design flow, Basic FPGA architecture, FPGA Technologies, FPGA families- Altera Flex 8000FPGA, Altera Flex 10FPGA, Xilinx XC4000 series FPGA, Xilinx Spartan XL FPGA, Xilinx Spartan II FPGAs, Xilinx Vertex FPGA. Case studies: FPGA Implementation of Half adder and full adder. Introduction to synthesis: Logic synthesis, RTL synthesis, High level Synthesis.	**UNIT V:** **VLSI Design Issues:** VLSI Design issues and design trends, design process, design for testability, technology options, power calculations, package selection, clock mechanisms, mixed signal design, ASIC design flow, and introduction to SoC design. FPGA Design: Basic FPGA architecture, FPGA configuration, configuration modes, FPGA designs processFPGA design flow, FPGA families.
	UNIT- VI: **Introduction to Low Power VLSI Design:** Introduction to Deep submicron digital IC design, Low Power CMOS Logic Circuits: Over view of power consumption, Low – power design through voltage scaling, Estimation and optimisation of switching activity, Reduction of switching capacitance. Interconnect Design, Power Grid and Clock Design.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	VLSI LABORATORY	VLSI LAB
Course Code	R1632047	171EC6L08
Syllabus	i. Design and Implementation of an Universal Gates. ii. Design and Implementation of an Inverter iii. Design and Implementation of Full Adder iv. Design and Implementation of Full Subtractor v. Design and Implementation of Decoder vi. Design and Implementation of RS-Latch vii. Design and Implementation of D-Latch viii. Design and Implementation asynchronous counter ix. Design and Implementation of static RAM cell x. Design and Implementation of 8 bit DAC using R-2R latter network	1. Digital circuit simulation 2. Digital circuits Schematics and its functional response verification of logic gates 3. Digital circuits Schematics and its functional response verification of complex logic gates and combinational circuits 4. Layout Extraction of Logic gates. 5. Layout Extraction of complex gates and combinational circuits 6. Performing DRC for logic gates 7. Performing DRC for complex gates and combinational circuits 8. Performing LVS / Net list extraction for logic gates 9. Performing LVS / Net list extraction for complex gates and combinational circuits 10. PEX estimation for the given logic circuits 11. PEX estimation for the given complex gates and combinational circuits **Augmented Experiments**: (Minimum of two experiments has to be performed) 1. Layout design for specific constraints (delay, power dissipation) 2. DRC / LVS / PEX verification of Multiplexer. 3. DRC / LVS / PEX verification of a given SOP(Z= (AB+C)D)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Digital Communications Lab	Digital Communications Lab
Course Code	R1632048	171EC6L09
Syllabus	1. Time division multiplexing. 2. Pulse code modulation. 3. Differential pulse code modulation. 4. Delta modulation. 5. Frequency shift keying. 6. Phase shift keying . 7. Differential phase shift keying. 8. Companding 9. Source Encoder and Decoder 10. Linear Block Code-Encoder and Decoder 11. Binary Cyclic Code – Encoder and Decoder 12. Convolution Code – Encoder and Decoder	1. Verify Time division multiplexing and demultiplexing. 2. Obtain digital equivalent of analog voltage using Pulse code modulation. 3. Convert analog voltages into their digital equivalents using Delta modulation. 4. Observe the process of Frequency shift keying modulation and demodulation. 5. Verify the process of Phase shift keying modulation and demodulation. 6. Verify the operation of Differential phase shift keying. 7. Minimize coding redundancy using Source Encoder and Decoder. 8. Perform error detection and correction using Linear Block Code-Encoder and Decoder. 9. Perform error detection and correction using Binary Cyclic Code – Encoder and Decoder 10. Perform error detection and correction using Convolution Code – Encoder and Decoder. **Augmented experiments:** (Minimum of two experiments has to be performed) 1. Verify Differential pulse code modulation and demodulation. 2. Perform Non-Uniform quantization using Companding. 3. Verify Time Division Multiplexing and demultiplexing using MATLAB Simulink. 4. Observe the process of frequency shift keying modulation and demodulation using MATLAB Simulink. 5. Verify the operation of Differential Phase Shift Keying using MATLAB Simulink.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	DIGITAL IMAGE PROCESSING	DIGITAL IMAGE PROCESSING
Course Code	RT41043	R1641042
Syllabus	**Unit: 1** **Introduction to Image Processing:** Overview of Image Processing, Nature of Image Processing, Image Processing Computer Graphics, Signal Processing, Machine Vision, video Processing, Optics, Statistics, Digital Image Representation, Types of Images, Digital Image Processing Operations, Fundamental steps in Image Processing, Image Processing Applications. Digital Imaging System Digital Imaging System: Physical Aspects of Imaging Acquisition, Biological Aspects of Image Acquisition, Properties of Human Visual System, Review of Digital Camera, Sampling and Quantization, Image Quality – Optical Resolution, Image Display Device and Device Resolution, Digital Halftone Process – Random Dithering, Ordered Dithering, Non-Periodic Dithering, Image Storage and File Formats – Need for File Format Types of File Formats – GIF, JPEG, PNG, DICOM, SVG Structure of TIFF File Format	**UNIT-1 Introduction:** Introduction to Image Processing, Fundamental steps in digital image processing, components of an image processing system, image sensing and acquisition, image sampling and quantization, some basic relationships between pixels, an introduction to the mathematical tools used in digital image processing. Image Transforms: Need for image transforms, Discrete Fourier transform (DFT) of one variable, Extension to functions of two variables, some properties of the 2-D Discrete Fourier transform, Importance of Phase, Walsh Transform. Hadamard transform, Haar Transform, Slant transform, Discrete Cosine transform, KL Transform, SVD and Radon Transform, Comparison of different image transforms

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	Unit: 2 : **Digital Image Processing Operations:** Basic Relationship and Distance Metrics, Classification of Image Processing Operations, Arithmetic and Logical Operations, Geometric Operations, Image Interpolation Techniques, Set Operations, Statistical Operations, Convolution and Correlation Operations, Data Structures and Image Processing Applications Development – Relational Structures, Hierarchical Data Structures, Pyramids, Quadtrees, Application Development. Digital Image Transforms: Need for Image Transforms, Spatial Frequencies in Image Processing, Introduction to Fourier Transform, Discrete Fourier Transform, Fast Fourier Transform and its algorithm, Properties of Fourier transform – Sampling Theorem, Parseval's Theorem, Discrete Cosine Transform, Discrete Sine Transform, Walsh Transform, Hadamard Transform, Haar Transform, Slant Transform, SVD and KL Transforms or Hotelling Transform.	**UNIT-2 :** **Intensity Transformations and Spatial Filtering:** Background, Some basic intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters , sharpening spatial filters, Combining spatial enhancement methods Filtering in the Frequency Domain: Preliminary concepts, The Basics of filtering in the frequency domain, image smoothing using frequency domain filters, Image Sharpening using frequency domain filters, Selective filtering
	Unit: 3 **Image Enhancement:** Image Quality and Need for Image Enhancement, Image Quality Metrics, Image Enhancement Point Operations Linear and Non-linear Functions, Piecewise Linear Functions, Histogram-based Techniques, Spatial Filtering Concepts, Image Smoothing Spatial Filters and its design, Image Sharpening Spatial Filters Frequency Domain Filtering Image Restoration: Image Degradation (Restoration) Model, Categories of Image Degradations, Noise Modeling, Blur and Distortions, Image Restoration in	**UNIT-3 :** **Image Restoration and Reconstruction:** A model of the image degradation / Restoration process, Noise models, restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering, Linear, Position –Invariant Degradations,Estimating the degradation function, Inverse filtering, Minimum mean square error (Wiener) filtering, constrained least squares filtering ,geometric mean filter ,image reconstruction from projections.

	the Presence of Noise Only, Mean Filters, Order-statistics Filters, Image Restoration Techniques, Constrained and Unconstrained Methods, Geometrical Transforms for Image Restoration	
	Unit: 4 : **Image Compression:** Image Compression Model, Compression Algorithm and its types – Entropy Coding, Predictive Coding, Transform Coding, Layered Coding, Types of Redundancy – Coding Redundancy, Inter-pixel Redundancy, Psychovisual Redundancy, Chromatic Redundancy. Lossless Compression Algorithms, Run-length Coding, Huffman Coding , Shannon–Fano Coding, Bit-plane Coding, Arithmetic Coding, Lossless Predictive Coding, Lossy Compression Algorithms, Block Transform Coding, Image and Video Compression standards, JPEG, Video Compression – MPEG.	**UNIT-4 :** **Image compression:** Fundamentals, Basic compression methods: Huffman coding, Golomb coding, Arithmetic coding, LZW coding, Run-Length coding, Symbol-Based coding, Bit-Plane coding, Block Transform coding, Predictive coding Wavelets and Multiresolution Processing: Image pyramids, subband coding, Multiresolution expansions, wavelet transforms in one dimensions & two dimensions, Wavelet coding.
	Unit: 5 **Image Segmentation**: Introduction – Classification of Image Segmentation Algorithms, Detection of Discontinuities, Edge Detection – Staged in Edge Detection – Types of Edge Detectors, First-order Edge Detection Operators – Second-order Derivative Filters, Edge Operator Performance, Edge Linking Algorithms, Principle of Thresholding - Effect of Noise over Threshold Process and Peakiness Test - Parametric Methods, Non-parametric Methods, Principle of Region-growing –Dynamic Segmentation approaches , Validation of Segmentation Algorithms	**UNIT-5 :** **Image segmentation:** Fundamentals, point, line, edge detection, thresholding, region –based segmentation. Morphological Image Processing: Preliminaries, Erosion and dilation, opening and closing, basic morphological algorithms for boundary extraction, thinning, gray-scale morphology, Segmentation using morphological watersheds.

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	Unit: 6 **Colour Image Processing:** Introduction – Colour Fundamentals, Devices for Colour Imaging, Colour Image Storage and Processing – Colour Models – RGB Colour Model, HIS Colour Model, HSV Colour Model, HLS Colour Model, TV Colour Model– YUV Model, YIQ Model, Y Cb Cr Colour Model, Printing ColourModelsCMK and CMYK Models. Colour Quantization – Popularity Algorithm, Median-cut Algorithm, Octreebased Algorithm, Pseudo Colour Image Processing. Full Colour Processing – Colour Transformation – Image Filters for Colour Images – Noise in Colour Images, Colour Image Segmentation– Thresholding, K-means Clustering Technique, RGB Colour Space Segmentation, Colour Features.	**UNIT-6** **Color image processing**: color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise in color images, color image compression.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	DIGITAL SIGNAL PROCESSING LAB	DIGITAL SIGNAL PROCESSING LABORATORY
Course Code	RT32048	R1641048
Syllabus	1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions. 2. To verify linear convolution. 3. To verify the circular convolution. 4. To design FIR filter (LP/HP) using windowing technique a) Using rectangular window b) Using triangular window c) Using Kaiser window 5. To Implement IIR filter (LP/HP) on DSP Processors 6. N-point FFT algorithm. 7. MATLAB program to generate sum of sinusoidal signals. 8. MATLAB program to find frequency response of analog LP/HP filters. 9. To compute power density spectrum of a sequence. 10. To find the FFT of given 1-D signal and plot.	1) Generation of discrete time signals for discrete signals 2) To verify the Linear Convolution a) Using MATLAB b) Using Code Composer Studio(CCS) 3) To verify the Circular Convolution for discrete signals a) Using MATLAB b) Using Code Composer Studio(CCS) 4) To Find the addition of Sinusoidal Signals 5) To verify Discrete Fourier Transform(DFT) and Inverse Discrete Fourier Transform(IDFT) a) Using MATLAB b) Using Code Composer Studio(CCS) 6) Transfer Function Stability Analysis: using pole-zero plot, bode plot, Nyquist plot, z-plane plot.

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		PART-2 (FILTERS) 7) Frequency Response of IIR low pass Butterworth Filter 8) Frequency Response of IIR high pass Butterworth Filter 9) Frequency Response of IIR low pass Chebyshev Filter 10) Frequency Response of IIR high pass Chebyshev Filter 11) Frequency Response of FIR low pass Filter using Rectangle Window 12) Frequency Response of FIR low pass Filter using Triangle Window PART – 3(IMAGE PROCESSING) 13) An image processing in a false contouring system 14) To generate the histogram equalization to the image 15) To verify the Normalized Cross Correlation to the addition of noise and removal of noise using filters to an image. 16) Compute the edge of an image using spatial filters. 17) Perform the image motion blur and calculate PSNR to the noise image and also noise free image. 18) To verify the PSNR to the Second order Decomposition of Discrete Wavelet transforms and to the reconstructed image using inverse Discrete Wavelet transform

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Date: 01-06-2019

Department of Computer Science and Engineering

Syllabus revision Index 2019-2020

S.No	Name of the course	Percentage of syllabus change
1	Applied Physics	60%
2	Numerical Methods and Complex Variables	20%
3	Software Testing Methodologies	80%

KSP

Program Coordinator

Head of the Department

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Department of CSE
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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04/171BS2T04	191BS1T03/191BS2T07
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer.	UNIT-I Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes	UNIT-II Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P. Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism – Quarter wave plate and Half Wave plate- working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition Probabilities Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser- Applications	. UNIT-III Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi Dirac distribution function - expression for Fermi energy -Density of states. BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy

		bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: Quantum Mechanics: Introduction –Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy..	UNIT-IV Semiconductor Physics: Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & ntype - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: Band Theory of Solids: Bloch's theorem (qualitative) – Kronig – Penney model (Qualitative) – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. Semiconductor Physics: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.–	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius- Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-II	Numerical Methods and Complex Variables
Course Code	171BS2T02	191BS2T10
Syllabus	UNIT I: Solution of Algebraic and Transcendental Equations and Interpolation: Introduction- Bisection method – Method of false position – Iteration method – Newton - Raphson method.Errors in polynomial interpolation – Finite differences- Forward differences-Backward differences –Central differences – Relation between operators - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.	UNIT I: Solution of Algebraic and Transcendental Equations: Introduction to Numerical methods, Bisection method, Secant method, Method of false position, Iteration method, Newton - Raphson method.
	UNIT II: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series-Picard's method of successive approximations-Euler's method, Modified Euler's method – Runge - Kutta method (fourth order).	UNIT II: Interpolation: Introduction to Interpolation, Finite differences, Forward differences, Backward differences, Relation between operators, Newton's formula for interpolation, Lagrange's interpolation, Newton's divided difference interpolation.
	UNIT III: Fourier Series: Fourier series of periodic function - Dirichlet's conditions for Fourier expansion - Functions having points of discontinuities–Change of interval – Even and odd functions – Half-range series.	UNIT III: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule, Simpson's 1/3rd and 3/8th rule, Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge - Kutta method (fourth order).
	UNIT IV: Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse	UNIT - IV: Functions of Complex variables: Introduction, Continuity, Differentiability, Analyticity, Properties of analytic functions, CauchyRiemann equations in Cartesian and

	transforms – Finite Fourier transforms.	polar co-ordinates, Harmonic functions, Milne Thompson method.
	UNIT V: Applications of Partial Differential Equations: Classification of Higher order P.D.E - Method of separation of Variables- Solution of One dimensional Wave equation, Heat equation and two-dimensional Laplace equation.	UNIT V: Complex Integration: Introduction to complex integration, Cauchy's integral theorem, Cauchy integral formula, Liouville's theorem, Taylor's series, Maclaurin's series, Laurent's series (All theorems without proof), Singular point, Types of singularities-Isolated, Essential and Removable singularities, pole of order m, Residues, Cauchy Residue theorem.

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Department of Computer Science and Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Software Testing Methodologies	Software Testing Methodologies
Course Code	R1632054	171CS5E04
Syllabus	**UNIT-I:** **Introduction: Purpose of Testing,** Dichotomies, Model for Testing, Consequences of Bugs,Taxonomy of Bugs. **Flow graphs and Path testing:** Basics Concepts of Path Testing, Predicates, Path Predicates andAchievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.	**UNIT-I:** **Software Testing:** Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing. **Software Testing Terminology and Methodology:** Software Testing Terminology, Software Testing Life Cycle, relate STLC to SDLC, Software Testing Methodology.
	UNIT-II: **Transaction Flow Testing:** Transaction Flows, Transaction Flow Testing Techniques. **Dataflow testing:** Basics of Dataflow Testing, Strategies in Dataflow Testing, Application ofDataflow Testing.	**UNIT-II:** **Verification and Validation:** Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation. **Dynamic Testing I:** Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing.
	UNIT-III: **Domain Testing:** Domains and Paths, Nice & Ugly Domains, Domain testing, Domains And Interfaces Testing, Domain and Interface Testing, Domains and Testability. **Paths, Path products and Regular expressions:** Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions &	**UNIT-III:** **Dynamic Testing II:** White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing. **Static Testing:** Inspections, Structured Walkthroughs, Technical reviews.

	Flow Anomaly Detection.	
	UNIT-IV: **Syntax Testing:** Why, What and How, A Grammar for formats, Test Case Generation, Implementation and Application and Testability Tips. **Logic Based Testing:** Overview, Decision Tables, Path Expressions, KV Charts, and Specifications.	**UNIT-IV:** **Validation activities:** Unit testing, Integration Testing, Function testing, system testing, acceptance testing. **Regression testing:** Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques.
	UNIT-V: **State, State Graphs and Transition Testing:** State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips. .**Graph Matrices and Application:-** Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.	**UNIT-V:** **Software Testing Tools:** Introduction to Testing, need for Automated Testing, Taxonomy of Testing tools, Regression and performance Testing tools, Testing management tools, Source code testing tools, How to select a testing tool. Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner, Using Win runner, Mapping the GUI, Recording Test, working with Test, Enhancing Test, Checkpoints, Test Script Language, putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.
	UNIT-VI **Software Testing Tools**: Introduction to Testing, Automated Testing, Concepts of Test Automation, **Introduction to list of tools like Win** runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.	

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Department of Information Technology

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04	191BS1T03
Syllabus	**UNIT-I:** Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer	**UNIT-I:** **Wave Optics:** Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order – resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating.
	UNIT-II: **Diffraction:** Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power-Resolving power of a grating, Telescope and Microscopes	**UNIT-II:** **Quantum Mechanics:** Introduction – Matter waves – de Broglie's hypothesis – Davisson- Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle – interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism –Quarter wave plate and Half Wave plate- working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition	**UNIT-III:** **Free Electron Theory:** Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-

	Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	Dirac distribution function - expression for Fermi energy -Density of states . **BAND THEORY OF SOLIDS** Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: **Quantum Mechanics**: Introduction – Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy.	**UNIT-IV:** **Semiconductor Physics:** Introduction – Intrinsic semi conductors - density of charge carriers Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: (Qualitative) – energy bandsin crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. **Semiconductor Physics**: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.	**UNIT-V:** **Magnetism:** Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. **Dielectrics:** Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation Frequency dependence of polarization Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Software Testing Methodologies	Software Testing Methodologies
Course Code	R1632054	171CS5E04
Syllabus	**UNIT-I:** **Introduction:** Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs,Taxonomy of Bugs. **Flow graphs and Path testing:** Basics Concepts of Path Testing, Predicates, Path Predicates andAchievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.	**UNIT-I:** **Software Testing:** Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing. **Software Testing Terminology and Methodology:** Software Testing Terminology, Software Testing Life Cycle, relate STLC to SDLC, Software Testing Methodology.
	UNIT-II: **Transaction Flow Testing:** Transaction Flows, Transaction Flow Testing Techniques. **Dataflow testing:** Basics of Dataflow Testing, Strategies in Dataflow Testing, Application ofDataflow Testing.	**UNIT-II:** **Verification and Validation:** Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation. **Dynamic Testing I:** Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing.
	UNIT-III: **Domain Testing:** Domains and Paths, Nice & Ugly Domains, Domain testing, Domains And Interfaces Testing, Domain and Interface Testing, Domains and Testability. **Paths, Path products and Regular expressions:** Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions &	**UNIT-III:** **Dynamic Testing II:** White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing. **Static Testing:** Inspections, Structured Walkthroughs, Technical reviews.

	Flow Anomaly Detection.	
	UNIT-IV: **Syntax Testing:** Why, What and How, A Grammar for formats, Test Case Generation, Implementation and Application and Testability Tips. **Logic Based Testing:** Overview, Decision Tables, Path Expressions, KV Charts, and Specifications.	**UNIT-IV:** **Validation activities:** Unit testing, Integration Testing, Function testing, system testing, acceptance testing. **Regression testing:** Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques.
	UNIT-V: **State, State Graphs and Transition Testing:** State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips. **.Graph Matrices and Application:-** Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.	**UNIT-V:** **Software Testing Tools:** Introduction to Testing, need for Automated Testing, Taxonomy of Testing tools, Regression and performance Testing tools, Testing management tools, Source code testing tools, How to select a testing tool. Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner, Using Win runner, Mapping the GUI, Recording Test, working with Test, Enhancing Test,Checkpoints, Test Script Language, putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.
	UNIT-VI **Software Testing Tools**: Introduction to Testing, Automated Testing, Concepts of Test Automation, Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.	

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Department of Information Technology

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Operating Systems and Computer Networks Lab	Operating Systems and Computer Networks Lab
Course Code	161IT5L01	171IT5L01
Syllabus	UNIT-I: 1) CPU schedulingalgorithms 1.1) Simulate the FCFS CPU scheduling algorithm. 1.2) Simulate the SJF CPU schedulingalgorithm. 1.3) Simulate the Priority CPU schedulingalgorithm. 1.4) Simulate the Round Robin CPU schedulingalgorithm.	UNIT-I: 1) CPU Scheduling Algorithms 1.1) Simulate the FCFSCPU scheduling algorithm. 1.2) Simulate the SJFCPU scheduling algorithm. 1.3) Simulate the Priority CPU scheduling algorithm. 1.4) Simulate the Round Robin CPU scheduling algorithm
	UNIT-II: System calls 2.1) Implementation of fork (), wait (), exec(), and exit (), Systemcalls. 2.2) Implementation of cp command with the use of open(), read(), write() systemcalls. 2.3) Simulate Bankers Algorithm for Dead LockAvoidance	UNIT-II: 2) System calls 2.1) Implementation of fork (), wait(), exec(),and exit(), System calls. 2.2) Implementation of cp command with the use of open(),read(), write () system calls.
	UNIT-III: 3) Page ReplacementAlgorithms 3.1) Simulate the FIFO page replacement algorithm. 3.2) Simulate the LRU page replacement algorithm. 3.3) Simulate the LFU page replacement algorithm.	UNIT-III: 3) Deadlock Avoidance 3.1) Simulate Bankers Algorithm for Dead Lock Avoidance
	UNIT-IV: 4) Multiprogramming 4.1) Simulate the Multiprogramming with a fixed number of tasks (MFT). 4.2) Simulate the Multiprogramming with a variable number of tasks (MVT).	UNIT-IV: 4) Page Replacement Algorithms 4.1) Simulate the FIFO page replacement algorithm. 4.2) Simulate the LRU page replacement algorithm. 4.3) Simulate the LFU page replacement algorithm.
	UNIT-V: 5) FileAllocation 5.1) Simulate the Sequenced File allocation strategies. 5.2) Simulate the Indexed File allocation strategies. 5.3) Simulate the Linked File allocation strategies.	UNIT-V: 5) Multiprogramming 5.1) Simulate the Multiprogramming with affixed number of tasks (MFT). 5.2) Simulate the Multiprogramming with a variable number of tasks (MVT).
	6) Data Link LayerFraming 6.1) Implement data link layer framing method of Character stuffing 6.2) Implement data	6) File Allocation 6.1) Simulate the Sequenced File allocation strategies. 6.2) Simulate the Indexed File allocation

	link layer framing method of Bit stuffing	strategies. 6.3) Simulate the Linked File allocation strategies.
	7) ErrorDetection 7.1) On a data set of characters, implement CRC12 7.2) On a data set of characters, implement CRC16 7.3) On a data set of characters, implement CRCCCIP	7) Framing Method 7.1) Implement data link layer framing method of Character Stuffing. 7.2) Implement data link layer framing method of Bit stuffing
	8) Implement Dijkstra's algorithm to compute the shortest path through agraph	8) Cyclic Redundancy Check 8.1) Implement CRC12. 8.2) Implement CRC16. 8.3) Implement CRC CCIT.
	9) On a weighted subnet graph, obtain routing table at each node using distance vector routingalgorithm	9) Implement Dijkstra's algorithm to compute the shortest path through a graph
	10)On a subnet of hosts, obtain broadcasttree.	10) Implement distance vector routing algorithm
	11)Generate the Subnet Address for the given IP Address	11) Implement subnet of hosts to obtain Broadcasting
		12) Implement Sliding Window Protocol for Go – BackN

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Numerical methods and complex variables	Numerical methods and complex variables
Course Code	171BS2T10	191BS2T10
Syllabus	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms
	UNIT-II: Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.	**UNIT-II:** Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.
	UNIT-III: Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.	**UNIT-III:** Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.
	UNIT-IV: New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.	**UNIT-IV:** New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.
	UNIT-V: Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files	**UNIT-V:** Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files
	UNIT-VI: Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus	**UNIT-VI:** Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus

Department of Information Technology

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Numerical methods and complex variables	Numerical methods and complex variables
Course Code	171BS2T10	191BS2T10
Syllabus	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms
	UNIT-II: Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.	**UNIT-II:** Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.
	UNIT-III: Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.	**UNIT-III:** Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.
	UNIT-IV: New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.	**UNIT-IV:** New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.
	UNIT-V: Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files	**UNIT-V:** Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files
	UNIT-VI: Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus	**UNIT-VI:** Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus

	construction from Texts, Merging existing Thesauri	construction from Texts, Merging existing Thesauri

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Department of Petroleum Technology

Syllabus revision Index 2019-2020

S.No	Name of the course	Percentage of syllabus change
1.	Communicative English-I	90%
2.	Differential Equations and Linear Algebra	20%
3.	Engineering Physics	60%
4.	Engineering Physics lab	60%
5.	Partial Differential Equations and Vector Calculus	40%
6.	Chemistry of Materials	70%
7.	Engineering Chemistry Lab	50%
8.	Environmental Science	25%

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics	Engineering Physics
Course Code	171BS2T07	191BS1T02
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence – Interference in thinfilms (reflection geometry)— Newton's rings – construction and basic principle of Interferometer.	UNIT-I Crystal Structure: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer. Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes.	UNIT-II Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies. Ultrasonics:Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.
	UNIT-III: Polarization: Types of Polarization-production - Nicol Prism -Quarter wave plateand Half Wave plateworking principle of polarimeter (Sacharimeter) Lasers: Characteristics– Stimulated emission – Einstein's Transition Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	UNIT-III Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.
	UNIT-IV: Acoustics: Reverberation time - Sabine's formula – Acoustics of concert-hall. Ultrasonics: Production - Ultrasonic	UNIT-IV Laser: Introduction to wave optics & Interferometer-Characteristics– Spontaneous and Stimulated emission of

	transducers- Non-Destructive Testing- Applications. Crystallography & x-ray diffraction: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cellpacking fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.	radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO2 laserApplications. Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.
	UNIT-V: Magnetism: Classification based on Field, Temperature and order/disorder – atomicorigin – Ferromagnetism- Hysteresis- applications of magnetic materials (Para &Ferro). Dielectrics: Electric Polarization – Dielectric in DC fields – Internal field –Clausius Mossoti Equation – Dielectric loss- Ferroelectric Hysteresis and applications.	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization- Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials. Dielectrics: Introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Engineering Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L01
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of Rigidity modulus of a material- Torsional Pendulum....
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Determination of Young's modulus by method of single cantilever oscillations.
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Verification of laws of vibrations in stretched strings – Sonometer.
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Determination of spring constant of springs using coupled oscillators.
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6.Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	8. Determination of velocity of sound – Volume Resonator.	8. Measurement of magnetic susceptibility by Gouy's method.
	. 9. L- C- R Series Resonance Circuit.	9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
	10. Study of I/V Characteristics of Semiconductor diode.	10. Determination of dielectric constant by charging and discharging method
	11. I/V characteristics of Zener diode.	11. Determination of wavelength of Laser by diffraction grating
	12. Characteristics of Thermistor – Temperature Coefficients	12. Determination of particle size using Laser
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Determeination of Pressure variation using strain Gauge sensor.
	14. Energy Band gap of a Semiconductor p -	14.Determination of Moment of Inertia of a

	n junction.	Fly Wheel
	15. Hall Effect in semiconductors.	15.Determination of Velocity of sound – Volume Resoantor
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure-Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	MATHEMATICS-III	Partial Differential Equations and Vector Calculus
Course Code	171BS2T06	191BS2T05
Syllabus	UNIT - I: Laplace transforms: Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac's delta function, Periodic functions.	UNIT - I: Special Functions: Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.
	UNIT- II: Inverse Laplace transforms: Inverse Laplace transforms – Convolution theorem (without proof), Second shifting theorem. *(MATLAB Exercise: Computing Laplace transform off (t) using symbolic toolbox, Solving initial value problems using 'dsolve') Applications: Evaluating improper integrals, solving initial value problems using Laplace transforms.	UNIT II: Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.
	UNIT - III: Multiple integrals and Beta, Gamma functions: Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Applications: Finding Areas and Volumes.	UNIT III: Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals,Finding Area and Volume as a double integral
	UNIT - IV: Vector Differentiation: Gradient - Directional Derivatives - Divergence- Curl - Laplacian operator - Vector identities. Applications: Equation of continuity, potential surfaces	UNIT IV: Vector Differentiation: Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.
	UNIT - V: Vector Integration: Line integral – Work done - Surface and volume integrals,	UNIT V: Vector Integration: Introduction, Line integral, Work done, Surface and

	Green's Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.	volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Chemistry	Chemistry of Materials
Course Code	171BS1T03	191BS2T06
Syllabus	UNIT- I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I: Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boier corrosion, Industrial water treatment- zeolite and ion-exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II: Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	UNIT - III: Polymers and Building Materials: Introduction to polymers, functionality of

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite. Steel – Types of Steel, chemical composition – applications of alloy steels Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors:-Type – I, Type II – Characteristics and applications Semi conductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis:-Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV: Corrosion Engineering: Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment. Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).
	UNIT - V: Water Technology Hard water:- Reasons for hardness – units of hardness - determination of hardness andalkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments - Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.	UNIT - V: Material Science and Engineering: Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Solgel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines NanoTubes:Carbon nano tubes-Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications. Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-

		Preparation-Propertiesand Applications. Appendix:Introduction to Smart Materials.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)-Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-II	Numerical Methods and Integral Transforms
Course Code	171BS2T02	191BS3T15
Syllabus	UNIT I: Solution of Algebraic and Transcendental Equations and Interpolation: Introduction- Bisection method – Method of false position – Iteration method – Newton - Raphson method.Errors in polynomial interpolation – Finite differences- Forward differences- Backward differences –Central differences – Relation between operators - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.	UNIT-I: Solution of Algebraic and Transcendental Equations: Introduction, Bisection method, Secant method, Method of false position, Iteration method, Newton – Raphs on method. Interpolation: Introduction to Interpolation, Finite differences, Forward differences, Backward differences, Central difference, Relation between operators, Newton's formula for interpolation, Lagrange's interpolation, Newton's divided difference interpolation.
	UNIT II: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series-Picard's method of successive approximations- Euler's method, Modified Euler's method – Runge - Kutta method (fourth order).	UNIT-II: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule, Simpson's 1/3rd and 3/8th rule, Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge-Kutta method (fourth order).
	UNIT III: Fourier Series: Fourier series of periodic function - Dirichlet's conditions for Fourier expansion - Functions having points of discontinuities–Change of interval – Even and odd functions – Half-range series.	UNIT-III: Fourier series: Fourier series of periodic function, Dirichlet's conditions for Fourier expansion, Functions having points of discontinuities, Change of interval, Even and odd functions, Half-range series.
	UNIT IV: Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.	UNIT-IV: Fourier Transforms: Fourier integral theorem (without proof), Fourier sine and cosine integrals, Fourier Transforms, Fourier sine and cosine transforms, properties, inverse transforms, Finite Fourier transforms.
	UNIT V: Applications of Partial Differential	UNIT-V: Laplace Transforms: Laplace

	Equations: Classification of Higher order P.D.E - Method of separation of Variables- Solution of One dimensional Wave equation, Heat equation and two-dimensional Laplace equation.	transforms of standard functions, first and second shifting theorems, change of scale property, multiplication with t, division by t, Transforms of derivatives and integrals. Inverse Laplace transforms, Convolution theorem (without proof), Application of Laplace transform to initial valueproblems. **Not to beexamined** (MATLAB Exercise: Computing Laplace transform off(t) using symbolic toolbox, Solving initial value problems)

V. Veera

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Department of Petroleum Technology

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	DRILLING TECHNOLOGY	DRILLING TECHNOLOGY
Course Code	RT31273	R1631274
Syllabus	UNIT-I Overview of drilling: Drilling Planning Approaches- Drilling team- Types of drilling.	UNIT-I: Overview of drilling: Drilling plan- GTO -Types of drilling, Rotary bit technology- Drilling string basics. Drilling fluid properties- Drilling fluid hydraulics calculations- Bit Hydraulics-Optimization- Swab & Surge-pressures- Mud hydraulics analysis report- Lost circulation. Disposing of the drilling fluids waste and drill cuttings waste.
	UNIT-II Rotary bit technology- Drilling string basics.	UNIT-II: Hydrostatic pressure, Pore pressure, Causes of abnormal pore pressure, abnormal pore pressure evaluation- Mud logging methods - Measurement while drilling & logging while drilling data-Direct measurements of pore pressure - Formation integrity tests – Fracture gradient determination – Theory of wellbore – FIT procedural Guidelines – Predicting fracture gradient HPHT well design.
	UNIT-III Drilling fluids and hydraulics: Drilling fluid economics- Drilling fluid properties- Drilling fluid report hydraulics calculations- Bit Hydraulics-Optimization- Swab & Surge-pressures- Mud hydraulics analysis report- Lost circulation. Disposing of the drilling fluids waste and drill cuttings waste.	UNIT-III: Wellbore stability–Determination of the magnitude and direction of the in situ stress Determination of rock properties, Failure criteria – Stress distribution around a wellbore Procedure for determining safe mud weights to prevent hole collapse, Preventing borehole Instability Gas behavior in a well – Kick tolerance, How to calculate kick tolerance – Influence of FG on kick tolerance – Kick tolerance while drilling – Kick tolerance graph – Modifying the calculate kick tolerance – Use of kick tolerance to calculate wellbore pressures.
	UNIT-IV Casing & cementation: Fundamentals of casing design - Cementing: Introduction cement slurries-Typical field calculations- Cementing nomenclature- Cement additives –Cementation of lines - Casing & cementing analysis report.	UNIT-IV: Casing Functions of casing – Types of casing – Casing properties Casing specifications – Casing connections – Factors influencing casing design – Collapse criterion – Burst criterion – Combination strings – Tension criterion Compression loads – Biaxial effects – Triaxial analysis – Triaxial load capacity diagram, Casing seat

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Syllabus revision Index 2019-20

S.No	Name of the course	Percentage of syllabus change
1	Communicative English	90
2	Differential Equations and Linear Algebra	20
3	Engineering Physics	60
4	Engineering Physics Lab	60
5	Environmental Science	25
6	Partial Differential Equations and Vector Calculus	40
7	Chemistry of Materials	70
8	Engineering Graphics and Design	20
9	Engineering Chemistry Lab	50
10	Agricultural Process Engineering	20
11	Farm Power and Tractor Systems	20
12	Managerial Economics and Financial Analysis	20
13	Field Operation and Maintenance of Tractors Lab	20
14	Farm Machinery Lab - I	20
15	Design of Agricultural Machinery	20

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay- Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)- Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics	Engineering Physics
Course Code	171BS2T07	191BS1T02
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence – Interference in thinfilms (reflection geometry)– Newton's rings – construction and basic principle of Interferometer.	UNIT-I Crystal Structure: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer. Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes.	UNIT-II Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies. Ultrasonics:Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.
	UNIT-III: Polarization: Types of Polarization-production - Nicol Prism -Quarter wave plateand Half Wave plateworking principle of polarimeter (Sacharimeter) Lasers: Characteristics– Stimulated emission – Einstein's Transition Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	UNIT-III Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.
	UNIT-IV: Acoustics: Reverberation time - Sabine's formula – Acoustics of concert-hall. Ultrasonics: Production - Ultrasonic	UNIT-IV Laser: Introduction to wave optics & Interferometer-Characteristics– Spontaneous and Stimulated emission of

	transducers- Non-Destructive Testing- Applications. Crystallography & x-ray diffraction: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cellpacking fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.	radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO2 laserApplications. Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.
	UNIT-V: Magnetism: Classification based on Field, Temperature and order/disorder – atomicorigin – Ferromagnetism- Hysteresis- applications of magnetic materials (Para &Ferro). Dielectrics: Electric Polarization – Dielectric in DC fields – Internal field –Clausius Mossoti Equation – Dielectric loss- Ferroelectric Hysteresis and applications.	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization- Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials. Dielectrics: Introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Engineering Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L01
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of Rigidity modulus of a material- Torsional Pendulum....
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Determination of Young's modulus by method of single cantilever oscillations.
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Verification of laws of vibrations in stretched strings – Sonometer.
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Determination of spring constant of springs using coupled oscillators.
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6.Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	8. Determination of velocity of sound – Volume Resonator.	8. Measurement of magnetic susceptibility by Gouy's method.
	. 9. L- C- R Series Resonance Circuit.	9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
	10. Study of I/V Characteristics of Semiconductor diode.	10. Determination of dielectric constant by charging and discharging method
	11. I/V characteristics of Zener diode.	11. Determination of wavelength of Laser by diffraction grating
	12. Characteristics of Thermistor – Temperature Coefficients	12. Determination of particle size using Laser
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Determeination of Pressure variation using strain Gauge sensor.
	14. Energy Band gap of a Semiconductor p -	14.Determination of Moment of Inertia of a

	n junction.	Fly Wheel
	15. Hall Effect in semiconductors.	15.Determination of Velocity of sound – Volume Resoantor
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure-Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social- Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	MATHEMATICS-III	Partial Differential Equations and Vector Calculus
Course Code	171BS2T06	191BS2T05
Syllabus	UNIT - I: Laplace transforms: Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac's delta function, Periodic functions.	UNIT - I: Special Functions: Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.
	UNIT- II: Inverse Laplace transforms: Inverse Laplace transforms – Convolution theorem (without proof), Second shifting theorem. *(MATLAB Exercise: Computing Laplace transform off (t) using symbolic toolbox, Solving initial value problems using 'dsolve') Applications: Evaluating improper integrals, solving initial value problems using Laplace transforms.	UNIT II: Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.
	UNIT - III: Multiple integrals and Beta, Gamma functions: Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Applications: Finding Areas and Volumes.	UNIT III: Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals,Finding Area and Volume as a double integral
	UNIT - IV: Vector Differentiation: Gradient - Directional Derivatives - Divergence- Curl - Laplacian operator - Vector identities. Applications: Equation of continuity, potential surfaces	UNIT IV: Vector Differentiation: Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.
	UNIT - V: Vector Integration: Line integral – Work done - Surface and volume integrals,	UNIT V: Vector Integration: Introduction, Line integral, Work done, Surface and

	Green's Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.	volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Chemistry	Chemistry of Materials
Course Code	171BS1T03	191BS2T06
Syllabus	UNIT- I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I: Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boier corrosion, Industrial water treatment- zeolite and ion-exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II: Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	UNIT - III: Polymers and Building Materials: Introduction to polymers, functionality of

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite. Steel – Types of Steel, chemical composition – applications of alloy steels Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors:-Type – I, Type II – Characteristics and applications Semi conductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis:-Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV: Corrosion Engineering: Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment. Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).
	UNIT - V: Water Technology Hard water:- Reasons for hardness – units of hardness - determination of hardness andalkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments - Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.	UNIT - V: Material Science and Engineering: Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Solgel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines NanoTubes:Carbon nano tubes- Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications. Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-

		Preparation-Propertiesand Applications. Appendix:Introduction to Smart Materials.

Dr. Veena S

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Department of H & BS
Aditya Engineering College (A),

Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Drawing**	**Engineering Graphics and Design**
Course Code	**171ES2T03**	**191ES2T02**
Syllabus	**UNIT-I:** **Introduction to Engineering Drawing:** Lettering, Dimensioning, Types of lines. **Geometrical Constructions:** Construction of regular polygons by general method and inscribing circle method. Special methods for pentagon and hexagon. **Conic Sections:** Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods. **Scales:** Plain Scale, Diagonal Scale and Vernier Scales.	**Unit-I:** **Introduction to Engineering graphics:** Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes
	UNIT-II: **Orthographic Projections:** Introduction to orthographic projections, Projections of Points, Projections of Lines.	**UNIT-II:** **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.
	UNIT-III: **Projections of Planes:** Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.	**UNIT-III:** **Projections of solids:** Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.
	UNIT-IV: **Projections of Solids:** Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.	**UNIT-IV:** **Computer Aided Drafting** **Introduction to Computer Aided Drafting:** Basic drawing and editing commands-Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

	UNIT-V: **Isometric Projections** Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.	**UNIT-V:** **Isometric Projections:** Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

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Surampalem

Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

Dr. Aruna S

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11	Regulation	Pre-Revision	Post-Revision
	Course Title	Agricultural Process Engineering	Agricultural Process Engineering
	Course Code	R1631356	171AG5T11
	Syllabus	**Unit-I:** Scope and importance crop processing – principles and methods of food processing cleaning and grading of cereals. pulses & oilseeds – Principles. Size reduction –principle of comminution/ size reduction, mechanisms of comminution of food, particle shape, average particle size, Characteristics of comminuted products, crushing efficiency. determination and designation of the fineness of ground material, screen analysis, Empirical relationships (Rittinger's Kick's and Bond's equations), Work index, energy utilization, methods of operating crushers, classification based on particle size, nature of the material to be crushed, Size reduction equipment – Principal types, crushers (jaw crushers, gyratory, smooth roll), hammer mills and impactors, attrition mills, burr mill, tumbling mills, action in tumbling mills, Size reduction equipment –Ultra fine grinders (classification hammer mills, colloid mill), cutting machines (slicing, dicing, shredding, pulping), energy requirement of size deduction	**UNIT-I** **Unit Operation In Agricultural Processing:** Scope and importance crop processing – principles and methods of food processing, cleaning and grading of cereals,pulses& oilseeds. **Size Reduction:** Principles. Size reduction –principle of comminution/ size reduction, mechanisms of comminution of food, particle shape, average particle size. Characteristics of comminuted products, crushing efficiency. Determination and designation of the fineness of ground material, screen analysis,Empirical relationships (Rittinger's, Kick's and Bond's equations).Size reduction equipment –hammer mills and impactors, attrition mills, burr mill, tumbling mills, action in tumbling mills, Size reduction equipment –Ultra fine grinders(classification hammer mills, colloid mill), cutting machines (slicing, dicing, shredding, pulping)
		Unit –II: Mixing –Introduction, theory of solids mixing, criteria of mixer effectiveness and mixingindex for granular solids, mixing indices, criteria of mixer effectiveness and mixing index for pastes and semi solid masses, mixing index at zero time, rate of mixing, theory of liquid mixing, power requirement for liquids mixing. Mixing equipment – Mixers for low or medium viscosity liquids (paddle agitators, impeller agitators, powder-liquid contacting devices),	**UNIT –II** **Mixing:** Mixing –Introduction, theory of solids mixing, criteria of mixer effectiveness and mixing index for granular solids,mixing indices, criteria of mixer effectiveness and mixing index for pastes and semi-solid masses, rate of mixing, theory of liquid mixing, power requirement for liquids mixing. Mixing equipment – Mixersfor low or medium viscosity liquids (paddle agitators, impeller agitators, and powder-liquid contacting devices), mixersfor high viscosity liquids and

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		mixers for high viscosity liquids and pastes, mixers for dry powders and particulate solids	pastes, mixers for dry powders and particulatesolids
		Unit-III: Aerodynamics of agricultural products – drag coefficient – frictional drag and profile drag or pressure drag – and terminal velocity. Theory of separation, types of separators, cyclone separators, size of screens applications, Separator based on length, width, and shape of the grains, specific gravity, density. Air-screen grain cleaner-principle and types, Designconsiderations of air-screen grain cleaners, Sieve analysis-particle size determination, Ideal screen and actual screen–effectiveness of separation and related problems, Pneumatic separator, Threshing, Winnowing, cleaning and separation equipment	**UNIT-III** **Separator Units:** Theory of separation, types of separators,separator based on length, width, and shape of the grains, specific gravity, density cyclone separators, Pneumaticseparator. Air-screen grain cleanerprincipleand types, Design considerations of air-screen grain cleaners, Sieve analysis-particle sizedetermination, Ideal screen and actual screen–effectiveness of separation and related problems
		Unit –IV: Moisture content and methods for determination, moisture content representation, wet basis, dry basis, direct and indirect methods of moisture content determination, problems, Importance of EMC and method of determination, static-dynamic methods, EMC curve and EMC models, hysteresis effect, bound, unbound and free moisture. Principles of drying, theory of diffusion, mechanism of drying, falling rate, constant rate period, thin layer, deepbed dying methods, Effect of different factors on the drying process, different types of dryers, LSU dryer, flat bed batch dryer, fluidized bed dryer, rotary dryer	**UNIT –IV** **Drying:** Moisture content and methods for determination, moisture content representation, wet basis, dry basis, direct andindirect methods of moisture content determination, problems, Importance of EMC and method of determination,static-dynamic methods, EMC curve and EMC models,hysteresis effect, bound, unbound and free moisture.Principles of drying, theory of diffusion, mechanism of drying, falling rate, constant rate period, thin layer, deep-bed dying methods, Effect of different factors on the drying process, types of dryers
		Unit –V: Rice milling, principles and equipments, paddy parboiling methods and equipment, wheat milling, milling of pulses and oilseeds. Theory of filtration, rate of filtration, pressure drop during filtration, applications, Constant-rate filtration and constant–pressure filtration derivation of equation, Filtration equipment; plate and frame filter press, rotary filters, centrifugal filters and air filters	**UNIT –V** **Milling and Material Handling Devices:** Rice milling, principles and equipments, paddy parboiling methods and equipment, wheat milling, milling ofpulses and oilseeds. Scope and importance of material handling devices, Belt Conveyor–Inclined belt conveyors, idler spacing,belt tension, drive tension, belt tripper, Screw conveyor – Principle of operation, capacity, power, troughs, loading and

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		Unit –VI Scope and importance of material handling devices, study of different material handling systems– Classification, principles of operation, conveyor systems selection/design. Belt Conveyor– Inclined belt conveyors, idler spacing, belt tension, drive tension, belt tripper, Chain conveyor– Principle of operation, advantages, disadvantages, capacity and speed, conveying chain, Screw conveyor – Principle of operation, capacity, power, troughs, loading and discharge, inclined and vertical screw conveyors. Bucket elevator–Principle, classification, operation, advantages, disadvantages, capacity, speed, Bucket discharge, relationship between belt speed, pickup and bucket discharge, bucket types, Pneumatic conveying system- capacity and power requirement, types, selection of pneumatic conveying system, Gravity conveyor design considerations – capacity and power requirement	discharge.Bucket elevator–Principle, classification, operation, advantages, disadvantages, capacity, speed. Pneumatic conveyingsystem-capacity and power requirement, types, selection of pneumatic conveying system

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12	Regulation	Pre-Revision	Post-Revision
	Course Title	Farm Power and Tractor Systems	Farm Power and Tractor Systems
	Course Code	R1622356	171AG5T13
	Syllabus	**Unit-I:** Source of Farm Power – Conventional & Non Conventional Energy Sources - Classification of Tractor and I.C Engines – Study of I.C Engine components and their construction, operating principles and functions – Engine systems and their construction details and adjustment	**UNIT-I** Energy sources of Farm Power-Classification of I.C Engines – Study of I.C Engine components and their construction, operating principles and functions – Valves and valve working mechanism. Terminology connected with engine power - measurement of engine power – solvedproblems
		Unit-II: Valves and valve mechanism – Fuel and air supply stems – Cooling and lubricating systems – Electrical & ignition systems – I.C Engine fuels – their properties – Detonation and knocking in IC engines – Study of properties of coolants, antifreeze and anti corrosion materials – Lubricant types & study of their properties – Engine governing systems. Introduction to transmission system – Power transmission system of Tractor – Functions of a power transmission system. Clutch – Necessity of clutch in a tractor – Essential features of good clutch – Principal working of clutch – Clutch repairs and maintenance	**UNIT-II** **Engine fuel system:** I.C Engine fuels – their properties – Detonation and knocking in IC engines– fuel test – system working principles and construction details – turbo charger-fuel filter – Air cleaner – solved problems. **Engine governing system**: principles – classification - system working principles and construction details – governor hunting – governor regulation. **Lubrication system**: Lubricant types & study of their properties – lubricating oil tests - system working principles and construction details. **Electrical & ignition systems**: Spark and magneto ignition system - working principles and constructiondetails. **Cooling system** – purpose of cooling - Air cooling – water cooling – pressurized cooling - Study of properties of coolants, antifreeze and anti-corrosion materials - system working principles and constructiondetails
		Unit-III: Types of Clutch – Friction clutch, Dog clutch and Fluid coupling – Friction clutch – Single Plate clutch or single disc clutch, Multiple plate clutch or multiple disc clutch, cone clutch. Single Plate clutch or single disc clutch – constructional details and	**UNIT-III** Introduction of farm tractor – classification and selection of farm tractors. **Power transmission system:** Functions of a power transmission system. **Clutch** – Necessity of clutch in a tractor – Essential features of good

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		principle of working mechanism. Multiple plate clutch, splinted sleeve clutch type – constructional details and principle of working mechanism Ratchet & Pawl arrangement mechanism – constructional details and principle of working mechanism. Gears – Necessity for providing gear box – selective sliding type & constant mesh type – Mechanical advantage in gears – Torque ratio in Gears – working of Gear box. Differential unit and Final drive – Differential – Functions of crown wheel – Differential lock – functions – Final drive – functions of Finaldrive	clutch – Principal workingof clutch - Types of Clutch – Friction clutch, Dog clutch and Fluid coupling - Single Plate clutch or single disc clutch – constructional details and principle of working mechanism. Multiple plate clutch – constructional details and principle of working mechanism. **Gears** – Necessity for providing gear box – selective sliding type & constant mesh type – Mechanical advantage in gears – Torque ratio in Gears – working of Gear box – torque converter. **Differential unit**– Functions of crown wheel – Differential lock – functions – Final drive – functions of Final drive
		Unit-IV: Fluid coupling and torque connector – Brake mechanism – Requirements of good braking systems – classification of brakes – Mechanical brake and Hydraulic brake – working mechanism. Steering mechanism – Qualities of Steering mechanism, Main parts of steering mechanism Types of steering boxes – working of hydraulic steering. Hydraulic control system – working principals – Basic components of Hydraulic system – Types of hydraulic system – Position control –Draft control – Mixed control – Precautions for hydraulic system	**UNIT-IV** **Steering system** – Qualities of Steering mechanism, Main parts of steering mechanism. Types of steering boxes – working of hydraulic steering, parameters of steering systems-caster angle **Brake system** – Requirements of good braking systems – classification of brakes – Mechanicalbrake and Hydraulic brake – working mechanism. **Hydraulic control system** – working principals – Basic components of Hydraulic system – Types of hydraulic system – Position control – Draft control – Mixed control – Precautions for hydraulic system.Three point linkage system – Dash board of tractor – tractor tyre, front and rare wheels axle – track width adjustment of front wheels
		Unit-V: Tractor power out lets – P.T.O. Construction details, Tractor power out let – Belt pulley constructional details, Tractor power out let – Draw bar – construction details. Traction-Traction efficiency – Method for improving traction – Coefficient of traction – Rolling resistance – Wheel Slip or Track slip – Rimpull – crawler tractor. **Unit-VI:** Tractor testing – Preparation of tests – Types of tests – Test at the main power take off – Test at varying speeds at full load – Test	**UNIT-V** **Tractor power out lets**: P.T.O. Construction details– Belt pulley constructional details - Draw bar construction details. **Traction and traction theory:** Traction efficiency – Methods for improving traction – Coefficient of traction – Rolling resistance – Wheel Slip or Track slip – Rim pull – crawler tractor

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		at varying load-Belt or pulley shaft test – Drawbar test-Tractor engine performance. Determination of centre of Gravity – Suspension method – Balancing method – Weighing method. Tractor chassis machines – Functions of chassis frame – Tractor chassis – Mechanics of Tractor chassis	

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13	Regulation	Pre-Revision	Post-Revision
	Course Title	Managerial Economics and Financial Analysis	Managerial Economics and Financial Analysis
	Course Code	R1631355	171HS5E01
	Syllabus	**Unit I Introduction to Managerial Economics:** Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.	**UNIT-I** **Introduction to Managerial Economics and demand Analysis:** Definition of Managerial Economics – Scope of Managerial Economics and its relationship with other subjects – Concept of Demand, Types of Demand, Determinants of Demand-Demand schedule, Demand curve, Law of Demand and its limitations-Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting.
		Unit II Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)	**UNIT – II** **Production and Cost Analyses:** Concept of Production function-Cobb-Douglas Production function – Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs – Cost –Volume-Profit analysis-Determination of Breakeven point(simple problems)- Managerial significance and limitations of Breakeven point
		Unit III Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. **Cost Analysis:** Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs.	**UNIT – III** **Introduction to Markets, Pricing Policies & Types of Business Organization and BusinessCycles:** Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and

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		Imputed costs. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems)-Managerial Significance and limitations of BEA.	Output Determination – Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, and Internet Pricing: Flat Rate Pricing, Usage sensitive pricing and Priority Pricing. Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms – Business Cycles : Meaning and Features Phases of Business Cycle
		Unit IV Introduction to Markets & Pricing Policies: **Market structures:** Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. **Objectives and Policies of Pricing-Methods of Pricing:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization	**UNIT – IV** **Introduction to Accounting & FinancingAnalysis:** Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-RatioAnalysis
		Unit V Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario	**UNIT – V** Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization- Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods(payback period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and ProfitabilityIndex).
		Unit VI Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)	

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		Unit VII Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).	
		Unit VIII Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Profit Ratio, P/E Ratio and EPS)	

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14	Regulation	Pre-Revision	Post-Revision
	Course Title	Field Operation and Maintenance of Tractors Lab I	Field Operations and Maintenance of Tractors Lab
	Course Code	R1631358	171AG5L03
	Syllabus	1. Tractor Systems - Maintenance of air fuel system – cleaning of air cleaners – Frequent troubles and Remedies – Process to remove air lock in the diesel engine – Precautions in handling diesel fuels in diesel engine. 2. Maintenance of lubrication system – Frequent troubles and Remedies – Troubles in Lubrication system Excessive oil consumption – Care and maintenance of lubrication system. 3. Maintenance of transmission system – General maintenance – Differential trouble shooting – Frequent troubles and Remedies. 4. Maintenance of cooling system and cleaning of radiators - Frequent troubles and Remedies – Cooling system troubles – Over heating – slow warm up of the engine – care and maintenance of cooling system. 5. Maintenance of Ignition system – Care and Maintenance of batteries – Frequent troubles and Remedies – causes of ignition failure in battery system. 6. Maintenance of hydraulic system – Working principle – Basic components of hydraulic system – Types of hydraulic system – Frequent troubles and Remedies – Repairs and maintenance of hydraulic system – Precautions of hydraulic system. 7. Periodical maintenance of tractors – at 8 – 10 engine working hours – At 50 – 60 engine working hours at 100-120 engine working hours 8. Periodical maintenance of tractors – at 200-250 engine	1. To familiarize with different makes and models of 4 wheel and 2-wheel drive tractors. 2. To familiarize with tractor controls and learning procedure of tractor starting and stopping. 3. To practice the driving of tractor in forward and reverse gears – driving safety rules. 4. To study the steps to be taken for preparing the tractor for storage – removalof battery from the tractor – removal of tyres – drain the cooling system. 5. To study the maintenance of air fuel system – cleaning of air cleaners – Frequent troubles and remedies – Process to remove air lock in the dieselengine – Precautions in handling diesel fuels in diesel engine. 6. To study the maintenance of lubrication system – Frequent troubles and remedies – Troubles in lubrication system – Excessive oil consumption – Care and maintenance of lubricationsystem. 7. To study the maintenance of transmission system – General maintenance – Differential trouble shooting – Frequent troubles and Remedies. 8. To study the maintenance of cooling system and cleaning of radiators - Frequent troubles and Remedies – Cooling system troubles – Over heating –slow warm up of the engine – care and maintenance of cooling system. 9. To study the maintenance of Ignition system – Care and Maintenance of

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		working hours – at 480-500 engine working hours – at 960 – 1000 engine working hours. 9. Emission of smoke – Over heating of engines - maintenance of clutch brakes hydraulic problems.. 10. Maintenance of Agricultural machinery before and after use like primary tillage implements M.B. plough, Disc plough and secondary tillage implements like harrows, seed drills, weeders, cultivators. 11. Starting and stopping practice of the tractor and familiarization with instrumentation panel and controls 12. Driving in forward and reverse gears, Driving safety sales and study bean trepanned.	batteries – Frequent troubles and Remedies – causes of ignition failure in battery system. 10.To study the maintenance of hydraulic system – Working principle – Basic components of hydraulic system – Types of hydraulic system – Frequent troubles and Remedies – Repairs and maintenance of hydraulic system–Precautions of hydraulic system. 11. To study the maintenance of brakes – principle operation – classification ofbrakes – requirements of good braking system- frequent troubles and remedies – hydraulic brake troubleshooting. 12. To study the periodical maintenance of tractors – at 8 – 10 engine working hours – at 50 60 engine working hours at 100-120 engine working hours – at 200-250 engine working hours – at 480-500 engine working hours – at 960 –1000 engine working hours.
			List of Augmented experiments (Any two of the following experiments can be performed) 13. To study the emission of smoke – Over heating ofengines. 14. To study the maintenance of clutch, brakes and hydraulicproblems. 15. To study the components and working of 2 strokeengine. **16.** To study the components and working of 4 strokeengine

N.V. Gad
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15	Regulation	Pre-Revision	Post-Revision
	Course Title	Farm Machinery Lab - 1	Farm Machinery Lab - 1
	Course Code	R1631358	171AG6L04
	Syllabus	1. Study of various Farm Machinery, equipment. 2. Visit to machinery Production industry and ICAR, SAU'S research station. Determination of Field capacity and Field efficiency of primary tillage implements. 3. Draft and Fuel consumption measurement for different implements. 4. Study of different types of plough bottoms and shares of M.B. Plough. 5. Determination of disc angle, tilt angle, concavity of a disc plough. 6. Calculation of draft and horse power. 7. Study of seed-cum-ferti drill and seed metering mechanisms. 8. Calibration of seed drill and problems. 9. Study of sprayers, dusters and measurement of nozzle discharge and fieldcapacity. 10. Study of earth moving equipment through exposure Visit. . 11. Construction and working of rotovators and weeding equipment 12. Practical Examination	1. To study the various farm machinery equipments. 2. To visit the industry and ICAR, SAU'S research stations for exposure on present usage of farm machinery. 3. To measure vertical suction, horizontal suction and throat clearance of MBplough. 4. To determine the field capacity and field efficiency of primary tillage implements. 5. To measure the draft and fuel consumption of different farm equipment. 6. To determine disc angle, tilt angle and concavity of a disc plough. 7. To study and practice the various field operation patterns/ploughing methods. 8. To calibrate the seed cum fertilizer drill. 9. To calibrate the sprayers. 10. To measure the furrow cross-section by using furrow profile meter. 11. To find soil resistance by using cone penetrometer. 12. To practice the hitching of different implements to the tractor
			List of Augmented experiments (Any two of the following experiments can be performed) 13. To study about testing and evaluation of farm implements 14. To find the weeding efficiency of different weeders. 15. To study the productivity of earth moving equipment through exposure visit. 16. To study and measure the adjustments of tractor-implement hitching. 17. To study about maintenance of

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			farm implements and equipment. 18. To practice the various sowing methods.

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16	Regulation	Pre-Revision	Post-Revision
	Course Title	Design of Agricultural Machinery	Design of Agricultural Machinery
	Course Code	RT42351	R1642351
	Syllabus	**Unit-I:** Machine Design – Definition, Classification of machine design, General considerations in machine design, General procedure in machine design. Fundamental units, Mass and Weight, inertia, laws of motion, force, moment of force, couple mass density, torque, work, power and energy. Simple stress in machine parts – Introduction, load, stress, strain, tensile stress and strain, compressive stress and strain, Young's modulus, shear stress and strain, shear modulus, bearing stress	**Unit-I:** Machine Design – Definition, Classification of machine design, General considerations in machine design, General procedure in machine design. Fundamental units, Mass and Weight, inertia, laws of motion, force, moment of force, couple mass density, torque, work, power and energy. Simple stress in machine parts – Introduction, load, stress, strain, tensile stress and strain, compressive stress and strain, Young's modulus, shear stress and strain, shear modulus, bearing stress
		Unit-II: Stress strain diagram, working stress, Factor of safety and selection, stresses in composite bars, thermal stress, linear and lateral strain, Poisson's ratio, volumetric strain, bulk modulus and relations, impact stress, resilience. Principal stresses and principal planes – Theories of failure under static load, Rankine's theory, Guest's theory, maximum distortion theory, stress concentration, notch sensitivity - Important terms used in Limit System, fits, types of cotter joints, design of socket and spigot cotter joint. Knuckle joint, Dimensions of various parts of knuckles joint, methods of failure of knuckle joint, design procedure of knuckle joint	**Unit-II:** Stress strain diagram, working stress, Factor of safety and selection, stresses in composite bars, thermal stress, linear and lateral strain, Poisson's ratio, volumetric strain, bulk modulus and relations, impact stress, resilience. Principal stresses and principal planes – Theories of failure under static load, Rankine's theory, Guest's theory, maximum distortion theory, stress concentration, notch sensitivity - Important terms used in Limit System, fits, types of cotter joints, design of socket and spigot cotter joint. Knuckle joint, Dimensions of various parts of knuckles joint, methods of failure of knuckle joint, design procedure of knuckle joint
		Unit-III: Levers – Introduction, application of levers in engineering practice, design of lever hand levers, foot lever, cranked lever. Springs – Introduction, types of springs, material for helical springs, spring wire, terminology, springs in series and parallel, flat spiral springs, leaf springs, construction of leaf springs	**Unit-III:** Levers – Introduction, application of levers in engineering practice, design of lever hand levers, foot lever, cranked lever. Springs – Introduction, types of springs, material for helical springs, spring wire, terminology, springs in series and parallel, flat spiral springs, leaf springs, construction of leaf springs.
		Unit-IV: Design of Machinery : Design of Tillage equipment – cultivator,	**Unit-IV:** Shafts – Material used for shafts, types and sizes of shafts, stresses in

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		Rotovator, sowing machinery – Tractor Operated seed com Fertilize drill - Design of harvesting & threshing equipment – reaper, power thresher, Design of spraying equipment – Tractor mounted Boom sprayer	shafts, maximum working stresses. Design of shafts, for twisting moment, bending moments, fluctuating loads, axial load in addition to combined twisting and bending loads, design of shafts on the basis of rigidity. Keys and coupling – Introduction, types of keys, sunkkeys, saddle keys, tangent keys, round keys, splines, forces acting on sunk keys, strength of sunk key. Effect of key ways, shaft couplings, types of shaft couplings, muff coupling, design of flange coupling.
		Unit-V: Shafts – Material used for shafts, types and sizes of shafts, stresses in shafts, maximum working stresses. Design of shafts, for twisting moment, bending moments, fluctuating loads, axial load in addition to combined twisting and bending loads, design of shafts on the basis of rigidity. Keys and coupling – Introduction, types of keys, sunk keys, saddle keys, tangent keys, round keys, splines, forces acting on sunk keys, strength of sunk key. Effect of key ways, shaft couplings, types of shaft couplings, muff coupling, design of flange coupling **Unit-VI:** Fly wheel – Introduction, Coefficient of fluctuation of speed, fluctuation of energy, maximum fluctuation of energy, energy stored in a flywheel. Bearing – Introduction, classification of bearing, types of sliding contact bearings, rolling contact bearings – Introduction, advantages and disadvantages of rolling contact bearing over sliding contact bearings. Types of rolling contact bearings, types of radial ball bearings, Standard dimensions and designations of ball bearings, types of roller bearings, basic static load rating of rolling contact bearings, life of a bearing. Basic dynamic load rating of rolling contact bearings, dynamic load rating for rolling contact bearings under variable loads, reliability of bearing, lubrication of ball and roller bearings	**Unit-V:** Design of Machinery: Design of Tillage equipment –a. Cultivator (Manually Drawn and Power Operated); b. Rotavator (Power Operated); c. M.B Plough (Manually Drawn and Power Operated). Design of Sowing Machinery – Tractor Operated seed cum Fertilize drill **Unit-VI:** Design of harvesting equipment: a. Reaper, b. Mower. Design of Thresher: Power operated thresher (Spike toothand Raspbar), Design of spraying equipment – Tractor mounted Boom sprayer

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Aditya Nagar, ADB Road, Surampalem - 533437, Near Kakinada, E.G.Dt., Ph:99498 76662

Department of Humanities and Basic Sciences

Syllabus revision Index (2019-20)

S.No	Name of the course	Course code	Percentage of syllabus change
1	Communicative English	191HS1T01	90%
2	Differential Equations and Linear Algebra	191BS1T01	20%
3	Engineering Physics	191BS1T02	60%
4	Applied Physics	191BS1T03/191BS2T07	40%
5	Environmental Science	191MC1A01	50%
6	Communicative English Lab-I	191HS1L01	0%
7	Engineering Physics lab	191BS1L01	60%
8	Applied Physics Lab	191BS1L03/191BS2L05	60%
9	Engineering Chemistry Lab	191BS1L02/191BS2L04	50%
10	Partial Differential Equations and Vector Calculus	191BS2T05	40%
11	Chemistry of Materials	191BS2T06	70%
12	Transform Techniques	191BS2T08	60%
13	Numerical Methods and Complex Variables	191BS2T10	60%
14	Communicative English Lab -II	191HS2L02	0%
15	Engineering Chemistry	191BS1T04/191BS2T09	80%
16	Constitution of India	191MC1A02	100%

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)-Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics	Engineering Physics
Course Code	171BS2T07	191BS1T02
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence – Interference in thinfilms (reflection geometry)— Newton's rings – construction and basic principle of Interferometer.	UNIT-I Crystal Structure: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer. Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes.	UNIT-II Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies. Ultrasonics:Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.
	UNIT-III: Polarization: Types of Polarization-production - Nicol Prism -Quarter wave plateand Half Wave plateworking principle of polarimeter (Sacharimeter) Lasers: Characteristics– Stimulated emission – Einstein's Transition Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	UNIT-III Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.
	UNIT-IV: Acoustics: Reverberation time - Sabine's formula – Acoustics of concert-hall. Ultrasonics: Production - Ultrasonic	UNIT-IV Laser: Introduction to wave optics & Interferometer-Characteristics– Spontaneous and Stimulated emission of

	transducers- Non-Destructive Testing- Applications. Crystallography & x-ray diffraction: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cellpacking fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.	radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO2 laserApplications. Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.
	UNIT-V: Magnetism: Classification based on Field, Temperature and order/disorder – atomicorigin – Ferromagnetism- Hysteresis- applications of magnetic materials (Para &Ferro). Dielectrics: Electric Polarization – Dielectric in DC fields – Internal field –Clausius Mossoti Equation – Dielectric loss- Ferroelectric Hysteresis and applications.	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization- Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials. Dielectrics: Introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Engineering Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L01
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of Rigidity modulus of a material- Torsional Pendulum....
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Determination of Young's modulus by method of single cantilever oscillations.
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Verification of laws of vibrations in stretched strings – Sonometer.
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Determination of spring constant of springs using coupled oscillators.
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6.Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	8. Determination of velocity of sound – Volume Resonator.	8. Measurement of magnetic susceptibility by Gouy's method.
	. 9. L- C- R Series Resonance Circuit.	9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
	10. Study of I/V Characteristics of Semiconductor diode.	10. Determination of dielectric constant by charging and discharging method
	11. I/V characteristics of Zener diode.	11. Determination of wavelength of Laser by diffraction grating
	12. Characteristics of Thermistor – Temperature Coefficients	12. Determination of particle size using Laser
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Determeination of Pressure variation using strain Gauge sensor.
	14. Energy Band gap of a Semiconductor p -	14.Determination of Moment of Inertia of a

	n junction.	Fly Wheel
	15. Hall Effect in semiconductors.	15.Determination of Velocity of sound – Volume Resoantor
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure-Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	MATHEMATICS-III	Partial Differential Equations and Vector Calculus
Course Code	171BS2T06	191BS2T05
Syllabus	UNIT - I: Laplace transforms: Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac's delta function, Periodic functions.	UNIT - I: Special Functions: Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.
	UNIT- II: Inverse Laplace transforms: Inverse Laplace transforms – Convolution theorem (without proof), Second shifting theorem. *(MATLAB Exercise: Computing Laplace transform off (t) using symbolic toolbox, Solving initial value problems using 'dsolve') Applications: Evaluating improper integrals, solving initial value problems using Laplace transforms.	UNIT II: Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.
	UNIT - III: Multiple integrals and Beta, Gamma functions: Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Applications: Finding Areas and Volumes.	UNIT III: Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals,Finding Area and Volume as a double integral
	UNIT - IV: Vector Differentiation: Gradient - Directional Derivatives - Divergence- Curl - Laplacian operator - Vector identities. Applications: Equation of continuity, potential surfaces	UNIT IV: Vector Differentiation: Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.
	UNIT - V: Vector Integration: Line integral – Work done - Surface and volume integrals,	UNIT V: Vector Integration: Introduction, Line integral, Work done, Surface and

	Green's Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.	volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Chemistry	Chemistry of Materials
Course Code	171BS1T03	191BS2T06
Syllabus	UNIT- I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I: Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boier corrosion, Industrial water treatment- zeolite and ion-exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II: Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	UNIT - III: Polymers and Building Materials: Introduction to polymers, functionality of

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite. Steel – Types of Steel, chemical composition – applications of alloy steels Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors:-Type – I, Type II – Characteristics and applications Semi conductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis:-Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV: Corrosion Engineering: Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment. Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).
	UNIT - V: Water Technology Hard water:- Reasons for hardness – units of hardness - determination of hardness andalkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments - Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.	UNIT - V: Material Science and Engineering: Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Solgel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines NanoTubes:Carbon nano tubes- Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications. Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-

		Preparation-Propertiesand Applications. Appendix:Introduction to Smart Materials.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Cloud Computing	Cloud Computing
Course Code	162CO2E08	172CO2E08
Syllabus	**UNIT-I:** Basic Structure Of Computers: Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.	**UNIT-I:** Basic Structure of Computers: Computer Types, Functional Units, Basic Operational Concepts, Bus structures, Software, Performance, Historical Perspective. Machine Instruction and Programs: Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Additional Instructions.Case Study: ARM, Motorola and Intel Instruction sets.
	UNIT-II: Machine Instruction and Programs: Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions	**UNIT-II:** Arithmetic : Addition and Subtraction of Signed Numbers, Signed-Operand Multiplication, Floating-Point Numbers and Operations – IEEE Standard for Floating-Point Numbers, Arithmetic Operations on Floating-Point Numbers. Basic Processing Unit: Some Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, Micro programd Control -Microinstructions, Micro program Sequencing, Wide Branch Addressing, Microinstructionswith Next –Address
	UNIT-III: Type of Instructions: Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations	**UNIT-III:** The Memory System: Some Basic Concepts, Read-Only Memories - ROM, PROM, EPROM, EEPROM, Flash Memory, Speed, Size and Cost, Cache Memories - Mapping Functions, Replacement Algorithms, Performance considerations – Interleaving, Hit Rate and Miss Penalty, Virtual Memories, Memory Management Requirements, Secondary Storage
	UNIT-IV: INPUT/OUTPUT ORGANIZATION: Accessing I/O Devices,	**UNIT-IV:** Input/Output Organization: Accessing I/O Devices, Interrupts -

	Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)	Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, modes of transfer –Programd I/O, Interrupt initiated I/O & Direct Memory Access, Buses - Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interfaces - Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB).
	UNIT-V: The MEMORY SYSTEMS: Basic memory circuits, Memory System Consideration, ReadOnly Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, INTERLEAVING Secondary Storage: Magnetic Hard Disks, Optical Disks,	**UNIT-V:** Pipelining : Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets, Datapath and Control Considerations, Superscalar Operation.

Signature of the Course Coordinator

Signature of the HOD

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Department of Electrical and Electronics Engineering

(Power Electronics and Drives)

Syllabus revision Index for 2019-2020

S. No	Name of the course	Percentage of syllabus change
1	Analysis of Power Electronic Converters	20
2	Power Converters Laboratory	70
3	Artificial Intelligence Techniques	88
4	Renewable Energy Technologies	54
5	HVDC Transmission and Flexible AC Transmission Systems	62
6	Power Electronic Control of Electrical Drives	80
7	Electric Drives Laboratory	74

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Dept: Of Electrical & Electronics Engineering
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Department of Electrical and Electronics Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Analysis of Power Electronic Converters**	**Analysis of Power Electronic Converters**
Course Code	**172PD1T02**	**192PD1T02**
Syllabus	**UNIT-I: AC voltage Controllers:** Single Phase AC Voltage Controllers with PWM control only -synchronous tap changers – Three Phase AC Voltage Controllers-Analysis of Controllers with star and delta connected resistive, resistive - inductive loads-Effects of source and load inductances-Application-numerical problems	**UNIT-I: Overview of Switching Devices**: Power MOSFET, IGBT, GTO, GaN devices-static and dynamic characteristics, gate drive circuits for switching devices.
	UNIT –II: AC-DC converters: Single phase full and half Converters with inductive load- Power factor improvements: Extinction angle control-symmetrical angle control - single phase sinusoidal PWM-Single phase series converters- numerical problems - Three Phase full and half Converter with inductive load-harmonic analysis -Power factor improvements-three phase PWM-twelve pulse converters- numerical problems	**UNIT–II: AC-DC converters**: Single phase fully controlled converters with RL load– Evaluation of input power factor and harmonic factor- Continuous and Discontinuous load current, Power factor improvements, Extinction angle control, symmetrical angle control, PWM control. Three Phase AC-DC Converters, fully controlled converters feeding RL load with continuous and discontinuous load current, Evaluation of input power factor and harmonic factor-three phase dual converters.
	UNIT-III: Power Factor Correction Converters: Single-phase single stage boost power factor corrected rectifier, power circuit principle of operation, and steady state- analysis, three phase boost PFC converter	**UNIT-III: Power Factor Correction Converters**: Single-phase single stage boost power factor corrected rectifier, power circuit principle of operation, and steady state- analysis, three phase boost PFC converter.
	UNIT –IV: PWM Inverters: Single phase full bridge inverters - sinusoidal PWM - modified PWM - phase displacement Control - Trapezoidal,	**UNIT–IV: PWM Inverters**: Principle of operation-Voltage control of single-phase inverters - sinusoidal PWM – modified PWM – phase displacement

	staircase, stepped, harmonic injection and delta modulation - numerical problems - Three-Phase Inverters-Sinusoidal PWM- 60 degrees PWM-Third Harmonic PWM- Space Vector Modulation- Comparison of PWM Techniques-current source inverters-Variable dc link inverter - numerical problems.	Control – Trapezoidal, staircase, stepped, harmonic injection and delta modulation. Voltage Control of Three-Phase Inverters- Sinusoidal PWM- 60 degrees PWM- Third Harmonic PWM-Space Vector Modulation- Comparison of PWM Techniques- Three phase current source inverters, Variable dc link inverter.
	UNIT V: Multi level inverters: Multilevel Concept, Types of Multilevel Inverters- Diode-Clamped Multilevel Inverter, Features of Diode-Clamped Inverter, Improved Diode-Clamped Inverter Flying-Capacitors Multilevel Inverter-Features of Flying-Capacitors Inverter Cascaded Multilevel Inverter- Principle of Operation- Features of Cascaded Inverter- Switching Device Currents-DC-Link Capacitor Voltage Balancing Features of Multilevel Inverters-Comparisons of Multilevel Converters.	**UNIT-V: Multi-level inverters:** Introduction, Multilevel Concept, Types of Multilevel Inverters- Diode-Clamped Multilevel Inverter, Principle of Operation, Features of Diode-Clamped Inverter, Improved Diode Clamped Inverter- Flying-Capacitors Multilevel Inverter- Principle of Operation, Features of Flying- Capacitors Inverter Cascaded Multilevel Inverter- Principle of Operation- Features of Cascaded Inverter Switching Device Currents-DC-Link Capacitor Voltage Balancing- Features of Multilevel Inverters-Comparisons of Multilevel Converters

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Department of Electrical and Electronics Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Power Converters & Drives Lab	Power Converters Laboratory
Course Code	172PD2L02	192PD1L02
Syllabus	1. Analysis and speed control of DC motor drive using 3-phase full Converter. 2. Analysis of a four quadrant Chopper feeding DC motor. 3. Analysis of a 3-phase A.C. Voltage controller fed to R & RL - load. 4. Analysis of Buck, Boost, Buck-Boost DC-DC converters. 5. Analysis of Single Phase IGBT based PWM Inverter connected to R & R-L load 6. Analysis of 3-phase IGBT based PWM Inverter feeding R & R-L load. 7. Analysis and speed control of 3 phase slip ring Induction motor by Static Rotor resistance controller. 8. Analysis of three phase SVPWM Pulse generation using PIC Micro controller/DSP processor. 9. Analysis of DSP based V/F Control of 3 phase Induction motor. 10. Analysis of vector control based speed control of three phase Induction Motor drive.	1. Study of DC-DC non-isolated converters such as Buck & Boost converter. 2. Study of DC-DC Buck-Boost and Cuk converters. 3. Study of 1-ϕ dual converter. 4. Determination of input p.f. and harmonic factor for 1-ϕ semi- converter and 1- ϕ full converter (Inductive load). 5. Study of p.f. improvement in 1-ϕ full-converter with symmetric and extinction angle control. 6. Study of 1-ϕ square wave and sinusoidal PWM inverter. 7. Study of 3-ϕ inverter with 120^0 and 180^0 mode of operation. 8. Study of 3-ϕ sinusoidal PWM inverter. 9. Study of 3-level NPC inverter. 10. Study of 5-level cascaded H-bridge inverter. 11. Determination of input p.f. and harmonic factor for 3-ϕ full converter (Inductive load). 12 Determination of input p.f. and harmonic factor for 3-ϕ semi converter (Inductive load). 13. Study the characteristics of IGBT, MOSFET & GTO"s. 14. Design of gate drive circuits for IGBT & MOSFET"s.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Artificial Intelligence Techniques**	**Artificial Intelligence Techniques**
Course Code	**172PD1E05**	**192PD1E04**
Syllabus	**UNIT - I: Introduction to Neural Networks:** Introduction, Humans and Computers, Biological Neural Networks, Historical development of neural network, Terminology and Topology, Biological and artificial neuron models, Basic learning laws.	**UNIT–I: Introduction**: Artificial Neural Networks (ANN) – definition and fundamental concepts – Biological neural networks –Artificial neuron – activation functions – setting of weights – typical architectures – biases and thresholds– learning/training laws and algorithms. Perceptron – architectures, ADALINE and MADLINE – linear separability- XOR function
	UNIT -II: Feed Forward Neural Networks: Introduction, Perceptron models: Discrete, continuous and multi-category, Training algorithms: Discrete and Continuous Perceptron Networks, Perceptron convergence theorem, Limitations and applications of the Perceptron model, Generalized delta learning rule, Feed forward recall and error back propagation training-Radial basis function algorithms-Hope field networks	**UNIT–II: ANN Paradigms**: ADALINE – feed forward networks – Back Propagation algorithm- number of hidden layers – gradient decent algorithm – Radial Basis Function (RBF) network. Kohonen"s self organizing map (SOM), Learning Vector Quantization (LVQ) and its types – Functional Link Networks (FLN) – Bidirectional Associative Memory (BAM) – Hopfield Neural Network.
	UNIT- III: Genetic algorithms and Modeling: Introduction-encoding-fitness function-reproduction operators-genetic operators-cross over and mutation-generational cycle-convergence of genetic algorithm.	**UNIT–III: Classical and Fuzzy Sets:** Introduction to classical sets- properties, Operations and relations; Fuzzy sets, Membership, Operations, Properties, Fuzzy relations, Cardinalities, Membership functions.
	UNIT- IV: Classical and Fuzzy Sets: Introduction to classical sets - properties, operations and relations; Fuzzy sets, membership, Uncertainty,	**UNIT–IV: Fuzzy Logic Controller (FLC):** Fuzzy logic system components: Fuzzification, Inference engine (development of rule base and

	operations, properties, fuzzy relations, cardinalities, membership functions. Fuzzy Logic System Components-Fuzzification, Membership value assignment, development of rule base and decision making system, de fuzzification to crisp sets, de fuzzification methods.	decision making system), Defuzzification to crisp sets-Defuzzification methods.
	UNIT -V: Application of AI Techniques: Design of PI controller for speed control of DC motor using neural networks and fuzzy logic-PWM Controllers -Selected harmonic elimination PWM- Space vector PWM using neural network.	**UNIT–V: Application of AI Techniques**: Speed control of DC motors using fuzzy logic –load flow studies using back propagation algorithm, single area and two area load frequency control using fuzzy logic.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Renewable Energy Systems	Renewable Energy Technologies
Course Code	172PD2E07	192PD1E05
Syllabus	**UNIT-I: Solar Energy**: Availability - Solar radiation data and measurement - Estimation of average solar radiation - Solar water heater types - Heat balance - Flat plate collector efficiency - Efficiency of heat removal - Thermo siphon flow calculation - Forced circulation calculation - Evacuated collectors - Basics of solar concentrators Solar Energy Applications - Solar air heaters - Solar Chimney - Crop driers - Passive solar AR-system - Active solar systems - Water desalination - Output from solar still - Principle of solar ponds.	**UNIT–I: Introduction:** Renewable Sources of Energy; Distributed Generation; Renewable Energy Economics - Calculation of Electricity Generation Costs; Demand-Side Management Options; Supply-Side Management Options; Control of renewable energy-based power Systems
	UNIT-II: Wind Energy: Nature of wind - Characteristics - Variation with height and time - Power in wind - Aerodynamics of Wind turbine - Momentum theory - Basics of aerodynamics - Aero foils and their characteristics - HAWT - Blade element theory - Prandtl's lifting line theory (prescribed wake analysis) VAWT aerodynamics - Wind turbine loads - Aerodynamic loads in steady operation - Yawed operation and tower shadow. Wind Energy Conversion System - Siting - Rotor selection - Annual energy output - Horizontal axis wind turbine (HAWT) - Vertical axis wind turbine (VAWT) - Rotor design considerations - Number	**UNIT–II: Induction Generators**: Principles of Operation; Representation of Steady-State Operation; Power and Losses Generated - Self-Excited Induction Generator; Magnetizing Curves and Self- Excitation – Mathematical Description of the Self-Excitation Process; Interconnected and Stand-alone operation - Speed and Voltage Control. U

	of blades - Solidity- Blade profile - Upwind/Downwind - Yaw system - Tower - Braking system - Synchronous and asynchronous generators and loads - Integration of wind energy converters to electrical networks - Inverters - Control system - Requirement and strategies - Noise Applications of wind energy.	
	UNIT –III: Biomass energy: Bio fuel classification - Examples of thermo chemical, Pyrolysis, biochemical and agrochemical systems - Energy farming - Direct combustion for heat - Process heat and electricity - Ethanol production and use - Anaerobic digestion for biogas - Different digesters - Digester sizing - Applications of Biogas - Operation with I.C.Engine	**UNIT–III: Wind Power Plants:** Site Selection; Evaluation of Wind Intensity; Topography; Purpose of the Energy Generation- General Classification of Wind Turbines; Rotor Turbines; Multiple-Blade Turbines; Drag Turbines; Lifting Turbines - Generators and Speed Control Used in Wind Power Energy; Analysis of Small wind energy conversion system.
	UNIT-IV: Ocean Energy: OTEC Principle - Lambert's law of absorption - Open cycle and closed cycle -heat exchanger calculations - Major problems and operational experience. Tidal Power - Principles of power generation - components of power plant - Single and two basin systems - Turbines for tidal power - Estimation of energy - Maximum and minimum power ranges - tidal powerhouse. Wave Energy - Concept of energy and power from waves - Wave characteristics - period and wave velocities - Different wave energy conservation devices (Saltor duck, oscillating water column and dolphin types) - operational experience.	**UNIT–IV: Photovoltaic Power Plants:** Solar Energy; Generation of Electricity by Photovoltaic Effect; Dependence of a PV Cell on Temperature and irradiance input-output Characteristics - Equivalent Models and Parameters for Photovoltaic Panels; MPPT schemes: P&O, INC, effect of partial shaded condition. Applications of Photovoltaic Solar Energy-Economical Analysis of Solar Energy
	UNIT-V: Geothermal Energy: Classification- Fundamentals of geophysics - Dry rock and hot aquifer energy analysis - Estimation of thermal power - Extraction techniques - Prime movers.	**UNIT–V: Fuel Cells**: The Fuel Cell; Low- and High-Temperature Fuel Cells; Commercial and Manufacturing Issues - Constructional Features of Proton Exchange-Membrane Fuel Cells; Reformers; Electrolyzer Systems; Advantages and Disadvantages of Fuel

		Cells - Fuel Cell Equivalent Circuit; Practical Determination of the Equivalent Model Parameters; Aspects of Hydrogen for storage

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	HVDC Transmission	HVDC Transmission and Flexible AC Transmission Systems
Course Code	172PD1E06	192PD1E06
Syllabus	**UNIT-I: EHV AC Transmission:** Limitation of EHV AC Transmission, Advantages of HVDC Technical economical reliability aspects. HVDC Transmission: General considerations, Power Handling Capabilities of HVDC Lines, Basic Conversion principles, static converter configuration. Types of HVDC links-Apparatus and its purpose.	**UNIT–I: HVDC Transmission**: DC Power Transmission: Need for power system interconnections, Evolution of AC and DC transmission systems, Comparison of HVDC and HVAC Transmission systems, Types of DC links, relative merits, Components of a HVDC system, Modern trends in DC Transmission systems.
	UNIT-II: Static Power Converters: 6-pulse bridge circuit and 12-pulse converters, converter station and Terminal equipment, commutation process, Rectifier and inverter operation, equivalent circuit for converter - special features of converter transformers. Comparison of the perform of diametrical connection with 6-pulse bridge circuit	**UNIT–II: Analysis of HVDC Converters:** Pulse number, choice of converter configurations, Analysis of Graetz circuit with and without overlap, voltage waveforms, Analysis of two and three valve conduction mode, Converter Bridge characteristics, Inverter mode of operation, voltage waveforms.
	UNIT –III: Control of HVDC Converters and systems: Constant current, constant extinction angle and constant Ignition angle control. Individual phase control and equidistant firing angle control, DC power flow control. Factors responsible for generation of Harmonics voltage and current harmonics effect of variation of α and μ. Filters Harmonic elimination.	**UNIT–III: HVDC Control**: Principles of DC link control, Converter Control characteristics, Control hierarchy Constant current Control, CEA Control, firing angle control of valves, starting and stopping of a dc link, Power control. Harmonics and Filters: effects of Harmonics, sources of harmonic generation, Types of filters –Design examples.
	UNIT-IV: HV AC and DC systems: Interaction between HV AC and DC	**UNIT–IV: Power Flow Analysis in AC/DC Systems**: Modelling of DC

	systems - Voltage interaction, Harmonic instability problems and DC power modulation. Development of DC circuit Breakers, Multi- terminal DC links and systems; series, parallel and series parallel systems, their operation and control.	links, solutions of AC-DC Power flow Flexible AC Transmission Systems (FACTS): FACTS concepts and general system conditions: Power flow in AC systems, Relative importance of controllable parameters, Basic types of FACTS controllers, shunt and series controllers, Current source and Voltage source converters.
	UNIT-V: Transient over voltages in HV DC systems: Over voltages due to disturbances on DC side, over voltages due to DC and AC side line faults. Converter faults and protection in HVDC Systems: Converter faults, over current protection - valve group, and DC line protection, circuit breakers. Over voltage protection of converters, surge arresters.	**UNIT–V: Static Shunt Compensators:** Objectives of shunt compensation, Methods of controllable VAR generation, Static Var Compensator, its characteristics, TCR, TSC, STATCOM, basic operating principle, control approaches and characteristics Static Series Compensators: Objectives of series compensator, variable impedance type of series compensators, TCSC, TSSC-operating principles and control schemes, SSSC, Power Angle characteristics, Control range and VAR rating, Capability to provide reactive power compensation, external control. Introduction to Unified Power Flow Controller, Basic operating principles, Conventional control capabilities, Independent control of real and reactive power.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Power Electronics Control of AC Drives**	**Power Electronic Control of Electrical Drives**
Course Code	**172PD2T06**	**192PD2T04**
Syllabus	**UNIT-I: 3-phase induction motor drives - Part 1**: Analysis of IM fed from non-sinusoidal supply, harmonic equivalent circuit, transient analysis - starting and plugging; variable frequency control, torque-slip relation, starting torque and braking torque, closed-loop VSI fed IM drive. Slip-ring IM control, closed-loop speed control with static rotor resistance, closed-loop speed control by using slip power recovery scheme.	**UNIT–I: Vector Control of Induction Motor Drive:** Principle of scalar and vector control, direct vector control, indirect vector control, rotor flux-oriented control, stator flux-oriented control, air gap flux-oriented control, decoupling circuits.
	UNIT-II: **3-phase induction motor drives - Part 2:** Concept of space vector, vector control of IM: direct or feed-back vector control, flux vector estimation, indirect or feed forward vector control, vector control of line side PWM converter, stator flux oriented vector control, vector control of converter fed inverter drive.	**UNIT–II: Sensor less Control of induction Motor Drive:** Advantages of speed sensor less control, voltage current based speed sensor less control, MRAS-model reference adaptive systems, Extended Kalman filter observers.
	UNIT-III: Synchronous motor and BLDC motor drives: Variable frequency control of synchronous motor, closed-loop control of inverter fed synchronous motor drive. Permanent magnet synchronous motor drive. BLDC motor drives, VSI fed BLDC motor drives, back emf, phase current and torque waveforms, control of BLDC motors with sensors, sensor-less control of BLDC motors	**UNIT–III: Direct Torque Control of Induction Motor Drive:** Principle of Direct torque control (DTC), concept of space vectors, DTC control strategy of induction motor, comparison between vector control and DTC, applications, space vector modulation-based DTC of induction motors.
	UNIT-IV: Traction drives: Motors	**UNIT–IV: Control of Permanent**

	employed in railway traction and road-vehicles, control of railway traction dc motors using ac-dc converters, control of railway traction ac motors using ac-dc and dc-ac converters, power electronic control circuits of electric vehicles and hybrid electric vehicles	**Magnet Synchronous Machines (PMSM) and Brushless DC (BLDC) Motor Drives:** Advantages and limitations of Permanent magnet machines, operating principle of PMSM, modeling of PMSM, operating principle of BLDC, modeling of BLDC, similarities and difference between PMSM and BLDC, need for position sensing in BLDC motors, control strategies for PMSM and BLDC, methods of reducing torque ripples of BLDC motor.
	UNIT-V: Switched reluctance and stepper motor drives: Switched reluctance motor operation and control: modes of operation, converter circuits closed-loop speed control. Stepper motor characteristics drive circuits for uni-polar and bipolar stepper motors.	**UNIT–V: Control of Switched Reluctance Motor (SRM) Drive:** SRM structure, Merits and limitations, stator excitation, converter topologies, SRM waveforms, Torque control schemes, speed control of SRM, torque ripple minimization, instantaneous -torque control using current controllers and flux controllers

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Power Converters & Drives Lab	Electric Drives Laboratory
Course Code	172PD2L02	192PD2L04
Syllabus	1. Analysis and speed control of DC motor drive using 3-phase full Converter. 2. Analysis of a four quadrant Chopper feeding DC motor. 3. Analysis of a 3-phase A.C. Voltage controller fed to R & RL - load. 4. Analysis of Buck, Boost, Buck-Boost DC-DC converters. 5. Analysis of Single Phase IGBT based PWM Inverter connected to R & R-L load 6. Analysis of 3-phase IGBT based PWM Inverter feeding R & R-L load. 7. Analysis and speed control of 3 phase slip ring Induction motor by Static Rotor resistance controller. 8. Analysis of three phase SVPWM Pulse generation using PIC Micro controller/DSP processor. 9. Analysis of DSP based V/F Control of 3 phase Induction motor. 10. Analysis of vector control based speed control of three phase Induction Motor drive.	1. Study of armature controlled separately excited DC drive with 1-ϕ full converter. 2. Study of chopper controlled separately excited DC drive. 3. Study of armature controlled separately excited DC drive with 3-ϕ full converter 4. Study of dynamic braking of DC drives. 5. Study of regenerative braking of DC drive. 6. Study of performance characteristics of a 3-ϕ induction motor using V/f control. 7. Vector control based speed control of induction motor. 8. Study of direct torque control of induction motor. 9. Speed control of PMSM drive with 3-ϕ inverter. 10. Speed control of BLDC drive with 3-ϕ inverter. 11. Speed control of switched reluctance motor drive.

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Department of Mechanical Engineering

M.Tech-Thermal Engineering

Syllabus revision Index (2019-20)

S .No	Name of the course	Percentage of syllabus change
1	Gas Turbines	40
2	Energy Conservation and Management	30
3	Computational Fluid Dynamics Lab-I	60
4	Thermal Engineering lab-I	50
5	Advanced Power Plant Engineering	48
6	Combustion Emissions& Environment	40
7	Automotive Engineering	30
8	Computational Fluid Dynamics Lab-II	30
9	Thermal Engineering Lab-II	30

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SURAMPALEM-533 437

Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Turbo Machines	Gas Turbines
Course Code	172TE1E07	192TE1E05
Syllabus	**UNIT-I:** **Fundamentals of Turbo Machines:** Classifications, Applications, Thermodynamic analysis, Isentropic flow, Energy transfer, Efficiencies, Static and Stagnation conditions, Continuity equations, Euler's flow through variable cross sectional areas, unsteady flow in turbo machines.	**UNIT-I:** **Introduction:** Review of the fundamentals, Classification of turbo machines, Applications of gas turbines. Gas Turbine Cycles for Shaft Power: Ideal shaft power cycles and their analysis, Practical shaft power cycles and their analysis.
	UNIT-II: **Steam Nozzles:** Convergent and Convergent-Divergent nozzles, Energy Balance, Effect of back pressure of analysis, Designs of nozzles. Steam Turbines: Impulse turbines, Compounding, Work done and Velocity triangle, Efficiencies, Constant reactions, Blading, Design of blade passages, Angle and height, Secondary flow, Leakage losses, Thermodynamic analysis of steam turbines.	**UNIT-II:** **Fundamentals of Rotating Machines:** Euler's energy equation, Components of energy transfer, Impulse and reaction machines, Degree of reaction, Flow over an airfoil, Lift and drag. Centrifugal Compressors: Construction and principle of operation, Factors affecting stage pressure ratio, Compressibility effects, Surging and choking, Performance characteristics.
	UNIT-III: **Gas Dynamics:** Fundamental thermodynamic concepts, isentropic conditions, mach numbers and area, Velocity relations, Dynamic Pressure, Normal shock relation for perfect gas, supersonic flow, oblique shock waves, Normal shock recoveries, detached shocks, aerofoil theory. **Centrifugal Compressor:** Types, Velocity triangles and efficiencies, Blade passage design, Diffuserand pressure recovery. Slip factor, Stanitz and Stodolas formula's, Effect of inlet mach numbers, Pre whirl, Performance.	**UNIT-III:** **Axial Flow Compressors:** Construction and principle of operation, Factors affecting stage pressure ratio, Degree of reaction, Three dimensional flow, Design process, Blade design, Stage performance, Compressibility effects, Off, design performance.

	UNIT-IV: **Axial Flow Compressors:** Flow Analysis, Work and velocity triangles, Efficiencies, Thermodynamic analysis, Stage pressure rise, Degree of reaction, Stage Loading, General design, Effect of velocity, Incidence, Performance. Cascade Analysis: Geometrical and terminology, Blade force, Efficiencies, Losses, Free end force, Vortex blades.	**UNIT-IV:** **Gas Turbine Combustion Systems:** Operational requirements, Factors affecting combustion chamber design, Combustion process, Flame stabilization, Combustion chamber performance, Practical problems, Gas turbine emissions.
	UNIT-V: **Axial Flow Gas Turbines:** Work done. Velocity triangle and efficiencies, Thermodynamic flow analysis, Degree of reaction, Zweifels relation, Design cascade analysis, Soderberg, Hawthrone, Ainley, Correlations, Secondary flow, Free vortex blade,Blade angles for variable degree of reaction, Actuator disc, Theory, Stress in blades, Blade assembling, Material and cooling of blades, Performances, Matching of compressors and turbines, off design performance.	**UNIT-V:.** **Axial and Radial Flow Turbines:** Construction and operation of axial flow turbines, Vortex theory, Estimation of stage performance, Overall turbine performance, Turbine blade cooling, Radial flow turbines.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Energy Management	Energy Conservation and Management
Course Code	172TE2T06	192TE1E07
Syllabus	**UNIT-I:** **Introduction:** Principles of energy management. Managerial organization, Functional areas for i) manufacturing industry, ii) Process industry, iii) Commerce, iv) Government, Role of Energy manager in each of these organizations. Initiating, Organizing and managing energy management programs.	**UNIT-I:** **Introduction:** The energy market, energy scenario, planning, utilization pattern and future strategy, Importance of energy management.
	UNIT-II: **Energy Audit:** Definition and concepts. Types of energy audits, Basic energy concepts, Resources for plant energy studies. Data gathering, Analytical techniques. Energy Conservation: Technologies for energy conservation, Design for conservation of energy materials, Energy flow networks. Critical assessment of energy usage. Formulation of objectives and constrains, Synthesis of alternative options and technical analysis of options, Process integration.	**UNIT-II:** **Energy Conservation:** Methods of energy conservation and energy efficiency for buildings, air conditioning, heat recovery and thermal energy storage systems Energy conservation in industries, Cogeneration, Combined heating and power systems.
	UNIT-III: **Economic Analysis:** Scope, Characterization of an investment project. Types of depreciation, Time value of money. Budget considerations, Risk analysis	**UNIT-III:** **Energy Management:** Principles of Energy Management, Energy demand estimation, Organising and Managing Energy Management Programs, Energy pricing. **Energy Audit:** Purpose, Methodology with respect to process Industries, Characteristic method employed in Certain Energy Intensive Industries.

	UNIT-IV: **Methods of Evaluation of Projects:** Payback, Annualized costs, Investor's rate of return, Present worth, Internal rate of return, Pros and cons of the common method of analysis, Replacement analysis	**UNIT-IV:** **Economic Analysis:** Scope, Characterization of an Investment Project.
	UNIT-V: **Alternative Energy Sources Solar Energy:** Types of devices for solar energy collections, Thermal storage system, Control systems. Wind Energy, Availability, Wind Devices, Wind Characteristics, performance of turbines and systems.:	**UNIT-V:** Relevant international standards and laws.

Course Coordinator

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Thermal Engineering Lab	Computational Fluid Dynamics Lab-I
Course Code	172TE1L01	192TE1L01
Syllabus	**List of Experiments:** 1. Dryness fraction estimation of steam. 2. Performance test and analysis of exhaust gases of an I.C. Engine. 3. Heat Balance sheet, Volumetric Efficiency and air fuel ratio estimation of an I.C. Engine. 4. COP estimation of vapour compression refrigeration test. 5. Performance analysis of Air conditioning unit. 6. Performance analysis of heat pipe. 7. Performance evaluation of Solar Flat Plate Collector 7. Performance evaluation of Shell and Tube heat exchanger. 8. Performance evaluation of combined steam and gas power generation cycle. 9. Measurement of boundary layer thickness over an object using wind tunnel.	**List of Experiments:** 1. Analysis of Transient state compressible flow through pipes 2. Performance Analysis of Heat Exchanger Device 3. 3.Calibration Performance characteristics of Combustion 4. Estimation of C.O.P for Refrigeration Cycle 5. Analysis of Gas cooled Air-Cooler 6. Performance of Air-Conditioner 7. Thermal Stresses in long cylinder 8. Determination of Insulated Wall Temperature 9. Temperature Gradient across solid Cylinder 10. Radiation Heat Transfer between Concentric Cylinders 11. Solid Liquid Phase Change 12. Thermal Loading on Support structure

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Thermal Engineering Lab	Thermal Engineering Lab-I
Course Code	172TE2L01	192TE1L02
Syllabus	**List of Experiments:** 1. Dryness fraction estimation of steam. 2. Performance test and analysis of exhaust gases of an I.C. Engine. 3. Heat Balance sheet, Volumetric Efficiency and air fuel ratio estimation of an I.C. Engine. 4. COP estimation of vapour compression refrigeration test. 5. Performance analysis of Air conditioning unit. 6. Performance analysis of heat pipe. 7. Performance evaluation of Solar Flat Plate Collector 8. Performance evaluation of Shell and Tube heat exchanger. 9. Performance evaluation of combined steam and gas power generation cycle. 10. Measurement of boundary layer thickness over an object using wind tunnel.	**List of Experiments:** 1. Forced Convection Apparatus: Determination of theoretical, experimental and empirical values of convection heat transfer coefficient for internal forced convection through a circular GIpipe. 2. Emissivity Apparatus: Determination of surface emissivity of a given aluminium test plate at a given absolute temperature. 3. Heat Pipe Demonstrator: Demonstration of near isothermal characteristic exhibited by a heat pipe in comparison to stainless steel and copperpipes. 4. Abel's apparatus: Determination of flash and fire points of a given oil sample. 5. Redwood Viscometer No. 1: Determination of kinematic and absolute viscosities of an oil sample given. 6. Distillation apparatus: Determination of distillation characteristic of a given sample of gasoline. 7. Two-Stage Reciprocating Air-Compressor: Determination of volumetric efficiency of the compressor as a function of receiver pressure. 8. Pin-Fin Apparatus: Determination of temperature distribution, efficiency and effectiveness of the fin working in forced convection environment.

		9. Natural Convection Apparatus: Determination of experimental and empirical values of convection heat transfer coefficient from a Vertical Heated Cylinder losing heat to quiescentair. 10. Composite Slab Apparatus: Determination of theoretical end experimental values of equivalent thermal resistance of a composites lab.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Thermal and Nuclear Power Plants	Advanced Power Plant Engineering
Course Code	172TE2E11	192TE2E11
Syllabus	**UNIT-I:** **Introduction:** Sources of energy, Type of Power plants. Direct energy conversion system, Energy sources in India, Recent developments in power generation, Combustion of coal, Volumetric analysis, Gravimetric analysis, Fuel gas analysis. Steam Power Plant: Introduction, General layout of steam power plant, Modern coal fired Steam power plant. Power plant cycle, Fuel Handling, Combustion equipment, Ash handling, Dust collectors.	**UNIT-I:** **Introduction to the sources of energy** Resources and development of power in India. **Steam Power Plant:** Plant layout, working of different circuits, fuel handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, ash handling systems. Combustion: properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction, dust collectors, cooling towers and heat rejection. corrosion and feed water treatment.
	UNIT-II: **Gas Turbine Power Plant:** Cogeneration. Combined cycle power plant, Analysis, Waste heat recovery, IGCC power plant, Fluidized bed, Combustion, Advantages, and Disadvantages.	**UNIT-II:** **Gas Turbine Plant:** Introduction – classification, construction – layout with auxiliaries, combined cycle power plants and comparison. Cogeneration of Power and Process heat. Waste heat recovery systems. **Hydro Projects and Plant:** Classification – typical layouts – plant auxiliaries – plant operation pumped storage plants.
	UNIT-III: **Nuclear Power Plant:** Nuclear physics, Nuclear Reactor, Classification, Types of reactors, Site selection. Method of enriching	**UNIT-III:** **Nuclear Power Station:** Nuclear fuel – breeding and fertile materials – nuclear reactor – reactor operation.

	uranium. Application of nuclear power plant. **Nuclear Power Plant Safety:** Bi-Product of nuclear power generation, Economics of nuclear power plant, Nuclear power plant in India, Future of nuclear power.	**Types of Reactors:** Pressurized water reactor, boiling water reactor, sodium, graphite reactor, fast breeder reactor, homogeneous reactor, gas cooled reactor, radiation hazards and shielding – radioactive waste disposal.
	UNIT-IV: **Economics of Power Generation:** Factors affecting the economics, Loading factors, Utilization factor, Performance and operating characteristics of power plant, Point economic load sharing, Depreciation. Energy rate, Criteria for optimum loading. Specific economic energy problem	**UNIT-IV:** **Combined Operations of Different Power Plants:** Introduction, advantages of combined working, load division between power stations, storage type hydro, electric plant in combination with steam plant, run, of, river plant in combination with steam plant, pump storage plant in combination with steam or nuclear power plant, co, ordination of hydro, electric and gas turbine stations, co, ordination of hydro, electric and nuclear power stations, co, ordination of different types of power plants. Power Plant Instrumentation and Control: Importance of measurement and instrumentation in power plant, measurement of water purity, gas analysis, O2 and CO2 measurements, measurement of smoke and dust, measurement of moisture in carbon dioxide circuit, nuclear measurements.
	UNIT-V: **Power Plant Instrumentations:** Classification, Pressure measuring instrument, Temperature measurement and Flow Measurement, Analysis of combustion gases, Pollution, types, Methods of control	**UNIT-V:** **Power Plant Economics and Environmental Considerations:** Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, load curves, load duration curve, definitions of connected load, maximum demand, demand factor, average load, load factor, diversity factor – related exercises. effluents from power plants and Impacton environment – pollutants and pollution standards – methods of pollution control.

J. D.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Fuels, Combustion& Environment	Combustion, Emissions and Environment
Course Code	172TE2T05	192TE2E12
Syllabus	**UNIT-I:** **Fuels:** Detailed classification – Conventional and Unconventional Solid, Liquid, gaseous fuels and nuclear fuels – Origin of Coal – Analysis of coal. Coal – Carburization, Gasification and liquefaction – Lignite: petroleum based fuels – problems associated with very low calorific value gases: Coal Gas – Blast Furnace Gas - Alcohols and Biogas.	**UNIT-I:** **Principles of Combustion:** Chemical composition, Flue gas analysis, dew point of products, Combustion stoichiometry, Chemical kinetics, Rate of reaction, Reaction order, Molecularity, Zeroth, first, second and third order reactions, complex reactions, chain reactions, Theories of reaction Kinetics, General oxidation behavior of HCs
	UNIT-II: **Principles of Combustion:** Chemical composition – Flue gas analysis – dew point of products – Combustion stochiometry. Chemical kinetics – Rate of reaction – Reaction order – Molecularity – Zeroth, first, second and third order reactions - complex reactions – chain reactions. Theories of reaction Kinetics – General oxidation behavior of HC's	**UNIT-II:** **Thermodynamics of Combustion:** Enthalpy of formation, Heating value of fuel, Adiabatic flame Temperature, Equilibrium composition of gaseous mixtures.
	UNIT-III: **Thermodynamics of Combustion:** Enthalpy of formation – Heating value of fuel -Adiabatic flame Temperature – Equilibrium composition of gaseous mixtures	**UNIT-III:** **Laminar and Turbulent Flames Propagation and Structure:** Flame stability, burning velocity of fuels, Measurement of burning velocity, factors affecting the Burning velocity. Combustion of fuel droplets and sprays, Combustion systems, Pulverized fuel furnaces- fixed, entrained and fluidized bed systems.
	UNIT-IV: **Laminar And Turbulent Flames Propagation And Structure:** Flame stability – Burning velocity of fuels – Measurement of burning	**UNIT-IV:** **Pollution Formation Measurement and Control:** Causes for Formation of NOx, SOx, COx, Smoke and UBHC. Different

	velocity – factors affecting the burning velocity. Combustion of fuel, droplets and sprays – Combustion systems – Pulverized fuel furnaces – fixed, Entrained and Fluidized Bed Systems	methods of measurement of pollutants. methods of controlling the formation of pollutants, BHARAT and EURO standards of emissions.
	UNIT-V: **Environmental Considerations:** Air pollution – Effects on Environment, Human Health etc. Principal pollutants – Legislative Measures – Methods of Emission control	**UNIT-V:** **Environmental Considerations:** Air pollution, effects on environment, human health etc. Principal pollutants, Legislative measures, methods of emission control.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Advanced Automobile Engineering	Automotive Engineering
Course Code	172TE2E12	192TE2E14
Syllabus	**UNIT-I:** **Transmission Systems:** Clutch, gearbox, propeller shaft, differential, axle and wheels	**UNIT-I:** **Introduction:** Overview of the course, Examination and Evaluation patterns, History of Automobiles, Classification of Automobiles. Power Plant: Classification, Engine Terminology, Types of Cycles, working principle of and IC engine, advanced classification of Engines, Multi cylinder engines, Engine balance, firing order.
	UNIT-II: **Breaking Systems:** Mechanical, hydraulic & pneumatic breaking systems. Antilock breaking systems. Safety and Security	**UNIT-II:** **Fuel System, Ignition System and Electrical System:** Spark Ignition engines, Fuel tank, fuel filter, fuel pump, air cleaner/filter, carburetor, direct injection of petrol engines. Compression Ignition engines, Fuel Injection System, air & solid injection system, Pressure charging of engines, super charging and turbo charging, Components of Ignition systems, battery ignition system, magneto ignition system, electronic ignition and ignition timing. Main electrical circuits, generating & stating circuit, lighting system, indicating devices, warning lights, speedometer.
	UNIT-III: **Steering & Suspension Systems:** Mechanical and power steering. Mechanical, electronic and adaptive suspension systems	**UNIT-III:** **Lubricating Systems and Cooling Systems:** Functions & properties of lubricants, methods of lubrication, splash type, pressure type, dry sump, and wet sump & mist lubrication. Oil filters, oil pumps, oil coolers. Characteristics of an effective cooling system, types of

		cooling system, radiator, thermostat, air cooling & water cooling. Transmission, Axles, Clutches, Propeller Shafts and Differential: Types of gear boxes, functions and types of front and rear axles, types and functions, components of the clutches, fluid couplings, design considerations of Hotchkiss drive torque tube drive, function and parts of differential and traction control.
	UNIT-IV: **Electrical & Electronic Systems:** Wiring circuits, Trouble diagnosis & Trouble shooting, charging, starting and lighting system.	**UNIT-IV:** **Steering System:** Functions of steering mechanism, steering gear box types, wheel geometry. Braking and suspension system: Functions and types of brakes, operation and principle of brakes, constructional and operational classification and parking brake. Types of springs shock observers, objectives and types of suspension system, rear axles suspension, electronic control and proactive suspension system. Wheels and Tyres: Wheel quality, assembly, types of wheels, wheel rims, construction of tyres and tyre specifications.
	UNIT-V: **Hybrid Vehicles & Motor Vehicle Act:** Components of hybrid vehicles, Motor vehicle act	**UNIT-V:** **Automation in Automobiles:** Sensors and actuators, electronic fuel injection system, electronic management system, automatic transmission, electronic transmission control, Antilock Braking System (ABS).

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Thermal Systems Design Lab	Computational Fluid Dynamics Lab -II
Course Code	172TE2L02	192TE2L03
Syllabus	**List of Experiments:** Analyze and optimize: a. Various mechanical components of steam, nuclear, gas turbine and solar power plants. b. Heat Exchangers. c. Cryogenic systems. d. Propulsion systems. e. Refrigeration & Air conditioning systems. f. Internal Combustion Engine systems. g. Internal flows & External flows over stream lined bodies. h. Nano-fluid characteristics. i. Bio-fuel characteristics. j. Wind Energy systems	**List of Experiments:** a. Static Structural Analysis of a Rectangular Plate with Circular hole b. Steady State Analysis of a Composite Slab c. Analysis of Laminar flow in a 3D Circular Pipe d. Analysis of Pressure and Velocity in a Convergent Divergent Nozzle e. Study of Variation of various losses in a Sudden contraction in pipes f. External flow analysis of a Cylinder g. 3 D analysis of a Rectangular Duct h. Internal Flow 3D analysis i. Study of Variation of various parameters in a Rotor j. Study of Variation of various parameters in a Rotary Compressor k. Transient State Analysis of a Sphere l. Analysis of Orifice in a Cylinder

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Thermal Systems Design Lab**	**Thermal Engineering Lab-II**
Course Code	**172TE2L02**	**192TE2L04**
Syllabus	**List of Experiments:** Analyze and optimize: a. Various mechanical components of steam, nuclear, gas turbine and solar power plants. b. Heat Exchangers. c. Cryogenic systems. d. Propulsion systems. e. Refrigeration & Air conditioning systems. f. Internal Combustion Engine systems. g. Internal flows & External flows over stream lined bodies. h. Nano-fluid characteristics. i. Bio-fuel characteristics. j. Wind Energy systems	**List of Experiments:** a. Natural convection through Pin-Fin. b. Forced convection. c. Natural convection through vertical Cylinder. d. Flame propagation analysis of gaseous fuels. e. Measurement of Viscosity by Sayboltz's Viscometer. f. Determination of Calorific Value of fuel. g. Performance evaluation of Shell and Tube heat exchanger. h. Performance test on Rotary Air Compressor. i. Performance test on Reciprocating Air Compressor. j. Measurement of Dryness Fraction by using Throttling Calorimeter. k. Performance evaluation of Solar Flat Plate Collector.

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Department of Electronics and communication Engineering

Syllabus revision Index (E.S.)

2019-20

S.No	Name of the course	Percentage of syllabus change
1	Network Security and Cryptography	30

Signature of the HOD

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Network Security & Cryptography	Network Security & Cryptography
Course Code	172EM1E06	192EM2E11
syllabus	**UNIT-I** **Introduction** Attacks Services and Mechanisms, Security attacks, Security services, A Model for Internetwork security. Classical Techniques: Conventional Encryption model, Steganography, Classical Encryption Techniques.	**UNIT–I:** **Security & Number Theory** Need, security services, Attacks, OSI Security Architecture, one time passwords, Model for Network security, Classical Encryption Techniques like substitution ciphers, Transposition ciphers, Cryptanalysis of Classical Encryption Techniques. Introduction, Fermat"s and Euler"s Theorem, The Chinese Remainder Theorem, Euclidean Algorithm, Extended Euclidean Algorithm, and Modular Arithmetic.
	UNIT-II **Modern Techniques:** Simplified DES, Block Cipher Principles, Data Encryption standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operations. **Algorithms:** Triple DES, International Data Encryption algorithm, Blowfish, RC5, CAST-128, RC2, Characteristics of Advanced Symmetric block cifers. Conventional Encryption: Placement of Encryption function, Traffic confidentiality, Key distribution, Random Number Generation. Public Key Cryptography: Principles, RSA Algorithm, Key Management, Diffie-Hellman Key exchange, Elliptic Curve Cryptography.	**UNIT-II:** **Private-Key (Symmetric) Cryptography** Block Ciphers, Stream Ciphers, RC4 Stream cipher, Data Encryption Standard (DES), Advanced Encryption Standard (AES), Triple DES, RC5, IDEA, Linear and Differential Cryptanalysis.

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	UNIT-III **Number Theory:** Prime and Relatively prime numbers, Modular arithmetic, Fermat's and Euler's theorems, Testing for primarily, Euclid's Algorithm, the Chinese remainder theorem, Discrete logarithms. Message authentication and Hash Functions: Authentication requirements and functions, Message Authentication, Hash functions, Security of Hash functions and MACs.	**UNIT-III:** **Public-Key (Asymmetric) Cryptography** RSA, Key Distribution and Management, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography, Message Authentication Code, hash functions, message digest algorithms: MD4 MD5, Secure Hash algorithm, RIPEMD-160, HMAC.
	UNIT-IV **Hash and MAC Algorithms:** MD File, Message digest Algorithm, Secure Hash Algorithm, RIPEMD-160, HMAC. Digital signatures and Authentication Protocols: Digital signatures, Authentication Protocols, Digital signature standards. Authentication Applications: Kerberos, X.509 directory Authentication service. Electronic Mail Security: Pretty Good Privacy, S/MIME	**UNIT-IV:** **Authentication:** IP and Web Security Digital Signatures, Digital Signature Standards, Authentication Protocols, Kerberos, IP security Architecture, Encapsulating Security Payload, Key Management, Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction.
	UNIT-V **IP Security:** Overview, Architecture, Authentication, Encapsulating Security Payload, Combining security Associations, Key Management. Web security: Web Security requirements, secure sockets layer and Transport layer security, Secure Electronic Transaction. Intruders, Viruses and Worms: Intruders, Viruses and Related threats. Fire walls: Fire wall Design Principles, Trusted systems.	**UNIT-V:** **System Security:** Intruders, Intrusion Detection, Password Management, Worms, viruses, Trojans, Virus Countermeasures, Firewalls, Firewall Design Principles, Trusted Systems.

Signature of the course coordinator

Signature of the HOD

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Department of Computer Science and Engineering

Syllabus revision Index 2019-2020

S.No	Name of the course	Percentage of syllabus change
1	Mathematical Foundations of Computer Science	80%
2	Big Data Analytics	60%
3	Internet of Things	80%
4	Machine Learning	85%

Program Coordinator

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Department of Computer Science and Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematical Foundations of Computer Science	Mathematical Foundations of Computer Science
Course Code	172CO1T04	192CS1T01
Syllabus	**UNIT-I:** Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus	**UNIT-I:** **Basic Probability and Random Variables:** Random Experiments, Sample Spaces Events, the Concept of Probability the Axioms of Probability, Some Important Theorems on Probability Assignment of Probabilities, Conditional Probability Theorems on Conditional Probability, Independent Events, Bayes Theorem or Rule. Random Variables, Discrete Probability Distributions, Distribution Functions for Random Variables, Distribution Functions for Discrete Random Variables, Continuous Random Variables.
	UNIT-II: **Set theory & Relations:** Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram. **Functions:** composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application. **Algebraic structures:** Algebraic systems, Examples and general properties, Semi groups and Monoids, groups, sub groups, Definitions,Examples,homomorphism,	**UNIT-II:** **Sampling and Estimation Theory:** Population and Sample, Statistical Inference Sampling With and Without Replacement Random Samples, Random Numbers Population Parameters Sample Statistics Sampling Distributions, Frequency Distributions, Relative Frequency Distributions, Computation of Mean, Variance, and Moments for Grouped Data. Unbiased Estimates and Efficient Estimates Point Estimates and Interval Estimates. Reliability Confidence Interval Estimates of Population Parameters,

	Isomorphism and related problems.	Maximum Likelihood Estimates.
	UNIT-III: **Elementary Combinatories:** Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.	**UNIT-III:** **Tests of Hypothesis and Significance:** Statistical Decisions Statistical Hypotheses. Null Hypotheses Tests of Hypotheses and Significance Type I and Type II Errors Level of Significance Tests Involving the Normal Distribution One-Tailed and Two-Tailed Tests P Value Special Tests of Significance for Large Samples Special Tests of Significance for Small Samples Relationship between Estimation Theory and Hypothesis Testing Operating Characteristic Curves. Power of a Test Quality Control Charts Fitting Theoretical Distributions to Sample Frequency Distributions, The Chi-Square Test for Goodness of Fit Contingency Tables Yates' Correction for Continuity Coefficient of Contingency.
	UNIT-IV: **Recurrence Relations:** Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.	**UNIT-IV:** **Algebraic Structures and Number Theory:** Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism. Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem).
	UNIT-V: **Graph Theory:** Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs, Graph Theory and Applications, Basic	**UNIT-V:** **Graph Theory:** Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits,

	Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers	Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

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Signature of the HOD

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Department of Computer Science and Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Big Data Analytics	Big Data Analytics
Course Code	172CO2T08	192CS1E01
Syllabus	**UNIT-I:** Data structures Implementation using Java: Linked List, Stacks, Queues, Sets, Maps, Generic classes and methods, Serialization.	**UNIT-I:** **Big Data:** What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies introduction to Hadoop, open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics, inter and trans firewall analytics.
	UNIT-II: **Working with Big Data:** Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Name node, Data node, Secondary Name node, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.	**UNIT-II:** **No SQL:** Introduction, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schema less databases, materialized views, distribution models, sharding, master-slave replication, peer-peer replication, sharding and replication, consistency, relaxing consistency, version stamps, Working with Cassandra, Table creation, loading and reading data.
	UNIT-III: **Writing MapReduce Programs:** A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Hadoop IO-Wrtiable Hierarchy, Basic	**UNIT-III:** **Hadoop:** Data formats, analyzing data with Hadoop, scaling out, Architecture of Hadoop distributed file system (HDFS), fault tolerance ,with data replication, High availability, Data

	programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner.	locality , Map Reduce Architecture, Process flow, Java interface, data flow, Hadoop I/O, data integrity, compression, serialization. Introduction to Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, Logical joins, Window functions, Optimization, Table partitioning, Bucketing, Indexing, Join strategies.
	UNIT-IV: **Pig:** Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin	**UNIT-IV:** **Apache spark:** Advantages over Hadoop, lazy evaluation, In memory processing, DAG, Spark context, Spark Session, RDD, Transformations-Narrow and Wide, Actions, Data frames ,RDD to Data frames, Catalyst optimizer, Data Frame Transformations, Working with Dates and Timestamps, Working with Nulls in Data, Working with Complex Types, Working with JSON, Grouping, Window Functions, Joins, Data Sources, Broadcast Variables, Accumulators, Deploying Spark- On-Premises Cluster Deployments, Cluster Managers-Standalone Mode, Spark on YARN , Spark Logs, The Spark UI- Spark UI History Server, Debugging and Spark First Aid
	UNIT-V: **Hive:** Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works with examples, Querying and Analyzing Data.	**UNIT-V:** **Spark:** Performance Tuning, Stream Processing Fundamentals, Event-Time and State full Processing - Event Time, State full Processing, Windows on Event Time- Tumbling Windows, Handling Late Data with Watermarks, Dropping Duplicates in a Stream, Structured Streaming Basics - Core Concepts, Structured Streaming in Action, Transformations on Streams, Input and Output

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Internet of Things	Internet of Things
Course Code	172CO2E09	192CS1E05
Syllabus	**UNIT-I:** Introduction to embedded systems and internet of things (iot): Architecture of Embedded Systems-Embedded Systems Development process- Architecture of Internet of Things- Applications of Embedded Systems and IoT-Challenges in designing an Embedded System.	**UNIT-I:** **Fundamentals Of IoT:** Evolution of Internet of Things, Enabling Technologies, IoT Architectures,oneM2M, IoT World Forum (IoT WF) and Alternative IoT models, Simplified IoT Architecture and Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.
	UNIT-II: **8051 Architecture And Programming:** Architecture- Instruction set-Programming ports, Timer/Counter, Serial communication, Interrupts in C.	**UNIT-II:** **IoT Protocols:** IT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks, Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks, Application Transport Methods: Supervisory Control and Data Acquisition, Application Layer Protocols: Co AP and MQTT.
	UNIT-III: **Overview Of Open Source Hardware And Its Relevance To Iot** :Introduction and Programming Arduino- Introduction and Programming Galileo-Introduction and Programming Raspberry Pi –	**UNIT-III:** **Design and Development:** Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks, Arduino, Board details, IDE

	Introduction and Programming Spark core- Introduction and Programming Intel Edison Comparison, analysis and relevance of above Hardware to IoT.	programming, Raspberry Pi, Interfaces and Raspberry Pi with Python Programming.
	UNIT-IV: **Iot- Technologies, Standards and Tools:** Fundamental characteristics and high level requirements of IoT- IoT Reference model-IoT ecosystem and Business models- Introduction to Protocols of IoT: D2D, D2S, S2S- Comparison between MQTT, CoAP, LWM2M, ETSI M2M- Introduction to simulation tools.	**UNIT-IV:** **Data Analytics and Supporting Services:** Structured Vs Unstructured Data and Data in Motion Vs Data in Rest, Role of Machine Learning – No SQL Databases, Hadoop Ecosystem, Apache Kafka, Apache Spark, Edge Streaming Analytics and Network Analytics, Xively Cloud for IoT, Python Web Application Framework, Django, AWS for IoT, System Management with NETCONF-YANG.
	UNIT-V: **Case Studies and Application Development For Iot Using Embedded Systems :** Smart cities- Smart environment-Smart Water- Smart metering- Security and emergencies-Smart agriculture- Techniques for writing Embedded code - Examples for Application development for IoT.	**UNIT-V:** **Case Studies/Industrial Applications:** Cisco IoT system, IBM Watson IoT platform, Manufacturing, Converged Plant wide Ethernet Model (CPwE), Power Utility Industry, Grid Blocks Reference Model, Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Machine Learning	Machine Learning
Course Code	172CO2E05	192CS2T03
Syllabus	**UNIT-I:** The Ingredients of Machine Learning Tasks: The problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. Binary Classification and Related Tasks: Classification, Scoring and ranking, Class probability estimation	**UNIT-I:** **Introduction-**Towards Intelligent Machines, Well posed Problems, Example of Applications in diverse fields, Data Representation, Domain Knowledge for Productive use of Machine Learning, Diversity of Data: Structured / Unstructured, Forms of Learning, Machine Learning and Data Mining, Basic Linear Algebra in Machine Learning Techniques.
	UNIT-II: **Beyond Binary Classification:** Handling more than two classes, Regression, Unsupervised and descriptive learning. **Concept Learning:** The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts.	**UNIT-II:** **Supervised Learning-** Rationale and Basics: Learning from Observations, Bias and Why Learning Works: Computational Learning Theory, Occam's Razor Principle and Overfitting Avoidance Heuristic Search in inductive Learning, Estimating Generalization Errors, Metrics for assessing regression, Metris for assessing classification.
	UNIT-III: **Tree Models:** Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. **Rule Models:** Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning.	**UNIT-III:** **Statistical Learning-** Machine Learning and Inferential Statistical Analysis, Descriptive Statistics in learning techniques, Bayesian Reasoning: A probabilistic approach to inference, K-Nearest Neighbor Classifier. Discriminant functions and regression functions, Linear Regression

		with Least Square Error Criterion, Logistic Regression for Classification Tasks, Fisher's Linear Discriminant and Thresholding for Classification, Minimum Description Length Principle.
	UNIT-IV: **Linear Models:** The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods. **Distance Based Models:** Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering.	**UNIT-IV:** **Support Vector Machines (SVM)-** Introduction, Linear Discriminant Functions for Binary Classification, Perceptron Algorithm, Large Margin Classifier for linearly seperable data, Linear Soft Margin Classifier for Overlapping Classes, Kernel Induced Feature Spaces, Nonlinear Classifier, Regression by Support vector Machines. **Learning with Neural Networks:** Towards Cognitive Machine, Neuron Models, Network Architectures, Perceptrons, Linear neuron and the Widrow-Hoff Learning Rule, The error correction delta rule.
	UNIT-V: **Probabilistic Models:** The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihood Probabilistic models with hidden variables. **Features:** Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting, introduction to computational learning theory.	**UNIT-V:** Multilayer Perceptron Networks and error back propagation algorithm, Radial Basis Functions Networks. **Decision Tree Learning**: Introduction, Example of classification decision tree, measures of impurity for evaluating splits in decision trees, ID3, C4.5, and CART decision trees, pruning the tree, strengths and weakness of decision tree approach.

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Department of Civil Engineering

Syllabus revision Index for the Academic Year 2019-2020 M.Tech Structural Engineering

S.No	Name of the course	Percentage of syllabus change
1	Structural dynamics	33.2
2	Bridge Engineering	49.8

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Department of Civil Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	STRUCTURAL DYNAMICS	Structural dynamics
Course Code	172SE1T04	192ST1T02
Syllabus	UNIT-I Introduction to Structural Dynamics Fundamental objective of Dynamic analysis – Types of prescribed loadings – methods of Discretization – Formulation of the Equations of Motion.	UNIT-I: Theory of vibrations: Introduction - Elements of vibratory system - Degrees of Freedom - Continuous System - Lumped mass idealization - Oscillatory motion - Simple Harmonic motion - Victorian representation of S.H.M. - Free vibrations of single degree of freedom system – un-damped and damped vibrations - critical damping - Logarithmic decrement - Forced vibration of SDOF systems - Harmonic excitation - Vibration Isolation - Dynamic magnification factor – Phase angle.
	UNIT-II Theory of Vibrations Introduction – Elements of a Vibratory system Degrees of Freedom of continuous systems - Oscillatory motion – Simple Harmonic Motion Free Vibrations of Single Degree of Freedom (SDOF) systems – Undamped and Damped – Critical damping – Logarithmic decrement – Forced vibrations of SDOF systems – Harmonic excitation – Dynamic magnification factor – Band width.	UNIT-II: Introduction to structural dynamics: Fundamental objectives of dynamic analysis Types of prescribed loading - Methods of discretization - Formulation of equations of motion by different methods – Direct equilibration using Newton"s law of motion / D"Alembert"s Principle, Principle of virtual work and Hamilton principle. Single degree of freedom systems: Formulation and solution of the equation of motion - Free vibration response - Response to Harmonic, Periodic, Impulsive and general dynamic loadings - Duhamel integral.
	UNIT –III Single Degree of Freedom System Formulation and Solution of	UNIT-III: Multi degree of freedom systems: Selection of the degrees of

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	the equation of Motion – Free vibration response – Response to Harmonic, Periodic, Impulsive and general dynamic loadings – Duhamel integral	Freedom - Evaluation of structural property matrices - Formulation of the MDOF equations of motion -Undamped free vibrations - Solutions of Eigen value problem for natural frequencies and mode shapes - Analysis of Dynamic response – Normal co-ordinates - Uncoupled equations of motion - Orthogonal properties of normal modes - Mode superposition procedure.
	UNIT-IV Multi Degree of Freedom System Selection of the Degrees of Freedom– Evaluation of Structural Property Matrices – Formulation of the MDOF equations of motion-Undamped free vibrations – Solution of Eigen value problem for natural frequencies and mode shapes – Analysis of dynamic response - Normal coordinates.	UNIT-IV: Practical vibration analysis: Introduction - Stodola method - Fundamental mode analysis - Analysis of second and higher modes - Holzer method - Basic procedure. Continuous Systems: Introduction - Flexural vibrations of beams - Elementary case – Derivation of governing differential equation of motion - Analysis of undamped free vibrations of beams in flexure - Natural frequencies and mode-shapes of simple beams with different end conditions - Principles of application to continuous beams.
	UNIT-V Continuous Systems Introduction – Flexural vibrations of beams – Elementary case – Equation of motion – Analysis of undamped free vibration of beams in flexure – Natural frequencies and mode shapes of simple beams with different end conditions.	UNIT-V: Introduction to earthquake analysis: Deterministic Earthquake Response: Systems on Rigid Foundations -Types of Earthquake Excitations – Lumped SDOF Elastic Systems, Translational Excitations - Generalized coordinate -SDOF Elastic Systems, Translational Excitations, Linear Static Method – Analysis for obtaining response of multi storied RC Building

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	BRIDGE ENGINEERING	Bridge Engineering
Course Code	172SE2E11	1925T1E04
Syllabus	UNIT-I Masonry Arch Bridge Design Masonry arch Bridge design details- Rise, radius, and thickness of arch- Arch ring- Dimensioning of sub structures- Abutments pier and end connections. (Ref: IRC- SP13).	UNIT–I: Concrete bridges: Introduction-Types of Bridges-Economic span Length –Types of loading-Dead load-live load-Impact Effect-Centrifugal force-wind loads-Lateral loadsLongitudinal forces- Seismic loads-Frictional resistance of expansion bearingsSecondary Stresses-Temperature Effect-Erection Forces and effects-Width of roadway and footway-General Design Requirements.
	UNIT-II Super Structure Slab bridge- Wheel load on slab- effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- Pigeaud's method- design of longitudinal girders- Guyon-Messonet method- Hendry Jaegar method- Courbon's theory. (Ref: IRC-21), voided slabs, T-Beam bridges	UNIT–II: Pigeaud's method: Design of longitudinal girders-Guyon-Messonet method-Hendry Jaegar method-Courbon's theory. (Ref: IRC-21), voided slabs, Super Structure: Slab bridge- Wheel load on slab- effective width method- slabs supported on two edges-cantilever slabs- dispersion length- Design of interior panel of slab- T-Beam bridges
	UNIT –III Plate Girder Bridges Plate girder bridges- Elements of plate girder and their design-web-flange- intermediate stiffener-vertical stiffeners- bearing stiffener-design problem.	UNIT–III: Box culverts: Single Cell Box Culvert – Design Loads, Design Moments, Shears and Thrusts. Design of Critical sections.
	UNIT-IV Prestressed Concrete and Composite Bridges Prestressed Concrete and Composite bridges- Preliminary dimensions-flexural and torsional parameters- Courbon's Theory – Distribution coefficients by exact analysis- design of girder section- maximum and minimum prestressing forces-eccentricity- live load and dead load shear forces- cable zone in girder- check for stresses at various sections- check for diagonal tension- diaphragms and end block design- short term and long term deflections-Composite action of composite brides- shear connectors- composite or transformed section- design problem. (Ref: IRC: Section-VI).	UNIT–IV: Plate girder bridges: Elements of plate girder and their design-web flange-intermediate stiffeners-vertical stiffeners-bearing stiffener-design problem.

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	UNIT-V Sub Structure & Culverts Sub structure- Abutments- Stability analysis of abutments- piers- loads on piers – Analysis of piers- Design problem(Ref: IRC-13, IRC-21, IRC-78)- Pipe culvert- Flow pattern in pipe culvers- culvert alignment-culvert entrance structure- Hydraulic design and structural design of pipe culverts- reinforcements in pipes. (Ref: IRC: SP-13).	**UNIT–V:** **Design of Prestressed Concrete Bridge** Flexural and Torsional parameters - Courbon's Theory - Distribution Coefficient by exact analysis - Design of girder section - maximum and minimum prestressing forces - Eccentricity - Live load and dead load shear forces - Cable Zone in Girder - Check for stresses at various sections - Check for diagonal tension - Diaphragms - End Block - Short term deflections

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Department of Management Studies

Syllabus revision Index (2019-20)

S.No	Name of the course	Percentage of syllabus change
1.	Managerial Economics	40
2.	Accounting for Managers	40
3.	Quantitative Analysis for Business Decisions	20
4.	Business Communication and Soft Skills	50
5.	Legal and Business Environment	50

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1.1.2. Table-Prior/Post revision of syllabus (2019-20)

Regulation	Pre-Revision	Post-Revision
Course Title	Quantitative Analysis for Business Decisions	Quantitative Analysis for Business Decisions
Course Code	174MB1T06	194MB1T04
Syllabus	UNIT - I: Basic Mathematical & Statistical Techniques: Linear, Quadratic, Logarithmic and Exponential Functions- Permutations and Combinations – Matrices - Elementary operations of matrices. Measures of Central Tendency – Measures of Dispersion –Simple Correlation and Regression Analysis Concept of Probability- Probability Rules – Joint and Marginal Probability – Baye's Theorem- Probability Distributions- Binomial, Poisson, Normal and Exponential Probability Distributions.	UNIT 1: Basic Mathematical & Statistical Techniques: Linear, Quadratic, Logarithmic and Exponential Functions -Permutations and Combinations-Matrices-Elementary operations of matrices
	UNIT – II Introduction to Decision Theory: Steps involved in Decision Making, different environments in which decisions are made, Criteria for Decision Making, Decision making under uncertainty, Decision making under conditions of Risk-Utility as a decision criterion, Decision trees, Graphic displays of the decision making process, Decision making with an active opponent.	UNIT – II Measure of Central Tendency – Measure of Dispersions-Simple correlation & Regression Analysis – Concept of ProbabilityProbability Rules-Joint and Marginal probability-Baye's Theorem-Probability Distributions - Binominal, Poisson, Normal & Exponential Probability Distributions.

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	UNIT - III: Linear Programming: Formation of mathematical modeling, Graphical method, the Simplex Method; Justification, interpretation of Significance of All Elements In the Simplex Tableau, Artificial variable techniques: Big M method, Two phase method.	UNIT – III Introduction of Decision Theory: Steps involved in decision making, different environments in which decisions are made, Criteria for decision making, Decision making under uncertainty, Decision making under conditions of Risk-Utility as a decision criterion, Decision trees, Graphic displays of the decision-making process, Decision making with an active opponent.
	UNIT - IV: Transportation, Assignment Models & Game theory: Definition and application of the transportation model, solution of the transportation problem, the Assignment Model, Traveling Salesman Problem. Game Theory: Introduction – Two Person Zero-Sum Games, Pure Strategies, Games with Saddle Point, Mixed strategies, Rules of Dominance, Solution Methods of Games without Saddle point – Algebraic, matrix and arithmetic methods.	UNIT IV: Sampling and Sampling Distributions-Estimation-Point and Interval Estimates of Averages and proportions of small and large samples – Concepts of Testing Hypothesis – One sample Test for Testing Mean and Proportion of large and small samples
	UNIT - V: P.E.R.T. & C.P.M. and Replacement Model: Drawing networks – identifying critical path – probability of completing the project within given time- project crashing – optimum cost and optimum duration. Replacement models comprising single replacement and group replacement	UNIT V: Test Two Samples – Tests of Difference between Mean and Proportions of small and large samples- Chi-square Test of Independence and Goodness of fitness -analysis of variance.

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1.1.2. Table-Prior/Post revision of syllabus (2019-20)

Regulation	Pre-Revision	Post-Revision
Course Title	Managerial communication & soft skills	Business communication and soft skills
Course Code	174MB1T04	194MB1T06
Syllabus	UNIT - I: Role of Communication in Business : Objective of Communication – The Process of Human Communication – Media of Communication-Written Communication -Oral Communication - Visual Communication - Audio Visual Communication – Silence - Developing Listening Skills – Improving Non-verbal communication skills – Cross Cultural Communication – problems and challenges.	UNIT – I: Purpose and process of communication: Objectives of Communication-Process of Communication- Types of communication; noise, listening skills, Types of listening, essentials of good listening and tips.
	UNIT - II: Managing Organization Communication: Formal and Informal Communication – Intrapersonal Communication – Models for Inter Personal Communication - Exchange Theory.	UNIT – II: Managing Organizational Communication: Formal and Informal Communication- AR19 MBA Aditya Engineering College (A) 17 Interpersonal and Intrapersonal communication- Role of Emotion in Interpersonal Communication- Barriers to Interpersonal Communication- Exchange Theory-Gateways for Effective Interpersonal Communication.
	UNIT - III: Managing Interpersonal Communication: Inter-Personal communication – Role of Emotion in Inter Personal Communication – Communication Styles – Barriers to Communication – Gateways to Effective Interpersonal Communication.	UNIT – III: Non-verbal communication and Body Language: Kinesics, Proxemics, Paralanguage, Haptics, handshakes, appropriate body language and mannerisms for interviews: business etiquettes- across different cultures.

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	UNIT - IV: Business Writing Skills: Significance of Business Correspondence - Essentials of Effective Business Correspondence - Business Letter and Forms - Meeting - Telephone Communication – Use of Technology in Business Communication. Report Writing – Meaning and Significance: Structure of Reports - Negative, Persuasive and Special Reporting: Informal Report – Proposals. Formal Reports.	UNIT – IV: Written communication: mechanics of writing, report writing-business correspondencebusiness letter format- Meetings and managing meetings- Resume Writing-Formats and Skills.
	UNIT - V: Presentation skills : Techniques of Presentation – Types of Presentation – Video Conferencing and formats – Interview – formal and informal – Interview techniques – Communication etiquettes.	UNIT- V Presentation skills: prerequisites of effective presentation, format of presentation; Assertiveness – strategies of assertive behavior; Communication skills for group discussion and interviews, Interview Techniques

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1.1.2. Table-Prior/Post revision of syllabus (2019-20)

Regulation	Pre-Revision	Post-Revision
Course Title	Legal aspects of business	Legal and business environment
Course Code	174MB3T14	194MB1T05
Syllabus	UNIT-1: Importance of Commercial Law: The Indian Contracts Act, 1872 – Nature of the Act and Classification of Contracts – Essentials of a Valid Contract – Offer and Acceptance – Capacity – Consideration –Free Consent –Legality of Object – Performance of a Contract – Discharge of a Contract – Breach of a Contract and Remedies	UNIT-I: Introduction: Concept of Business Environment-Definition-Characteristics-Environmental factors, Importance at national and international level – problems and challenges – Environmental Scanning: Importance, Process of scanning- NITI Aayog: It's Role in Economic Development of India- Technological Environment: Features, Its impact on Business, Restraints on Technological Growth
	UNIT-2: Sales of Goods Act: Distinction between Sales and Agreement to Sell – Conditions and Warranties – Performance of Contract of Sale –Transfer of Ownership – Rights of an Unpaid Seller. Consumer Protection Act, 1986: Consumer Right –Machinery for Redressal of Consumer Grievances.- Information Technology Act 2000.	UNIT-II: Economic and Political Environment: Concept-Definition of Economic EnvironmentEconomic Systems Relative merits and demerits of each systems-Economic PoliciesMonetary-Fiscal- Industrial policies since independence and their significance – regulatory and promotional framework. Structure of Indian Economy Nature and significance. Economic Planning-Objectives, Merits, Limitations-Concept and Meaning of Political Environment.

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	UNIT-3: Contract of Agency: Kinds of Agents –Creation of Agency- Duties and Rights of Principal and Agents- Principal's Liability for the Acts of the Agent-Liability of Agent – Termination of Agency. AR-17 MBA Aditya Engineering College (A) 36 Negotiable Instruments Act, 1881- Kinds of a Negotiable Instruments and endorsement-Presentation and discharge of Negotiable Instrument.	UNIT-III: Legal Environment: - Business Law: Meaning, scope and need for Business Law- Source of Business Law Indian Contract Act 1872: Its Essentials, Breach of Contract and remedies. Intellectual Property Rights. Negotiable Instruments Act 1881.
	UNIT-4: Indian Partnership Act, 1932: Meaning and Essentials of Partnership- Registration – Tests of Partnership-Duties and Rights of Partners – Dissolution of Partnership	UNIT-IV: Company Act 2013: Memorandum and alteration of Articles of Association-Partnership Act 1932: Duties of Partners- Dissolution of Partnership-Information Technology Act 2000: Digital Signature-Cyber Frauds
	UNIT-5: Company Act 1956: Nature and Types of Companies – Formation – Memorandum of AssociationArticles of Association – Kinds of Shares –Duties of Directors- Winding u	UNIT-V: Miscellaneous Acts: Sales of Goods Act 1930-Sale- agreement to Sale – Implied Conditions and Warranties Consumer Protection Act 1986- Competition Act- Environment (Protection) Act 1986- Foreign Exchange Management Act (FEMA).

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Department of Master of Computer Applications

Syllabus revision Index (2019-2020)

S.No	Name of the course	Percentage of syllabus change
1.	Problem Solving with C	70
2.	Computer Organization	40
3.	English Language Communication Skills Lab	50

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1.1.2. Table-Prior/Post revision of syllabus (2019-2020)

Regulation	Pre-Revision	Post-Revision
Course Title	C Programming & Data Structures	Problem Solving with C
Course Code	**173MC1T01**	**193MC1T01**
Syllabus	UNIT-I: Introduction to Computers, HW and SW concepts, Algorithm, pseudo code, flowchart, program development steps, Introduction to various IDE's and their use in C program development, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Control structures such as if, go to, labels, and switch statements.	UNIT-I: Introduction to Computers: Introduction to computer programming, Algorithm, flow chart, Program development steps. Computer languages: Machine level, Assembly level and High- level language. Number System: Conversions-decimal, binary, octal, hexadecimal. 'C' Fundamentals: Structure of a C-program, C-character set, C Tokensvariables, constants, identifiers, data types and sizes, operators.
	UNIT-II: Loops- while, do-while and for statements, break, continue, Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1- D arrays other than strings, 2-Dcharacter arrays – 2-D arrays other than character arrays – Multidimensional arrays.	UNIT-II: I/O Functions: Header files, Standard I/O library functions-formatted I/O functions. Decision making statements: simple if, if-else, nested if-else, else-if ladder, switchcase statements and sample programs. Iterative Statements: for, while, do-while. Jump Statements-break, continue, go to.
	UNIT-III: Functions: basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor. Passing 1-D arrays, 2-D	UNIT-III: Arrays: declaration, initialization, storing and accessing elements of 1-D, 2-D and multidimensional arrays, Array Applications: addition, multiplication, transpose, symmetry of a matrix,

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	arrays, and functions. Pointers: concepts, initialization of pointer variables, pointers and Function arguments, passing by address –dangling memory, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments.	Strings: declaration, initialization, reading and writing characters into strings, string operations, character and string manipulation functions.
	. UNIT-IV: Derived types: structures-declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typed of, bit-fields, Input and output – concept of a file, text files and binary files, Formatted I/o, file I/o operations Data Structures: Introduction to Data Structures – Time Complexity – Space Complexity – Pattern matching – naive method – Robin Karp Algorithm - Searching – Linear and binary search methods, sorting –Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.	. UNIT-IV: Functions- declaration, definition, prototype, function call, return statement, types of functions, parameter passing methods, and function recursion, Pre-processor: #define, #include Statement, #ifdef, #endif, and storage classes.
	UNIT-V: Single linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Trees- Binary tress, terminology, representation, traversals, Graphs - terminology, representation, graph versals (dfs & bfs) –Warshalls – Dijkstra – Kruskal – Prims Algorithms	UNIT-V: Structure and Union: Declaration, initialization, storing and accessing elements by using structure and union, Pointers: Introduction to pointers, defining a pointer variable, Pointer to Pointer, Examples of pointers, using pointers in expressions, pointers and arrays. Files: Definition, Input and output operation into file.

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1.1.2. Table-Prior/Post revision of syllabus (2019-2020)

Regulation	Pre-Revision	Post-Revision
Course Title	Computer Organization	Computer Organization
Course Code	173MC1T02	193MC1T02
	UNIT-I: Basic Structure Of Computers: Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.	UNIT-I: Basic Structure of Computers: Functional unit, Basic Operational concepts, Bus structures, System Software, Performance- Processor clock, basic performance equation, pipelining and super scalar operations, clock rate, CISC, RISC, performance measurement, the history of computer development-generations.
	UNIT-II: Machine Instruction and Programs: Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions	UNIT-II: Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions.
	UNIT-III: Type of Instructions: Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations	UNIT-III: Type of Instructions: Arithmetic and Logic Instructions, Branch Instructions, The Memory Systems: Basic memory circuits, Memory System Consideration, Read-Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, interleaving, Secondary Storage: Magnetic Hard Disks, Optical Disks

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Syllabus	UNIT-IV: INPUT/OUTPUT ORGANIZATION: Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)	UNIT-IV: Input/ Output Organization: Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)
	UNIT-V: The MEMORY SYSTEMS: Basic memory circuits, Memory System Consideration, Read- Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, INTERLEAVING Secondary Storage: Magnetic Hard Disks, Optical Disks, Processing Unit: Fundamental Concepts: Register Transfers, Performing An Arithmetic Or Logic Operation, Fetching A Word From Memory, Execution of Complete Instruction, Hardwired Control, Micro programmed Control: Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next – Address Field	. UNIT-V: Processing Unit: Fundamental Concepts: Register Transfers, Performing an Arithmetic or Logic Operation, Fetching a Word from Memory, Execution of Complete Instruction, Hardwired Control, Micro programmed Control: Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next –Address Field

T. Satya

Signature of the course coordinator

Berlah

Signature of the HOD

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ADITYA ENGINEERING COLLEGE

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Aditya Nagar, ADB Road, Surampalem - 533437, Near Kakinada, E.G.Dt., Ph:99498 76662

Department of Master of Computer Applications

1.1.2. Table-Prior/Post revision of syllabus (2019-2020)

Regulation	Pre-Revision	Post-Revision
Course Title	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
Course Code	**173MC1L01**	**193MC1L01**
SYLLABUS	Introduction to phonetics. 2. Introduction to Vowels and Consonants and associated phonetic symbols. 3. Introduction to Accent, Intonation and Rhythm. 4. Situational Dialogues/Role Play. 5. Debate 6. Public Speaking. 7. Group Discussions 8. Facing Interviews 9. Resume preparation 10. e – correspondence	1.Vowels, Consonants, Pronunciation, Phonetic Transcription. 2. Syllabification, Stress, Intonation, Listening Comprehension, Common errors in Pronunciation 3. In-house communication (situational dialogue/role play) a. Individual to individual/group i. Welcoming newcomers to the organization ii. Introducing the workplace culture iii. Explaining duties and responsibilities etc. iv. Motivating ('pep talk') v. Expressing / recording appreciation, praising /rewarding a subordinate or junior. b. Subordinate / Junior to superior i. Reporting problems / difficulties ii. Offering suggestions. 4. Data interpretation, reading comprehension, Public speaking: power point presentations Group discussions, Debates 5. Resume writing and interviews 6. Notices, Minutes of the meetings and e-Correspondence, GRE/TOEFL Models.

Signature of the course coordinator

Signature of the HOD

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