SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	4	1	-	5
Subject Name		Engineering Chemistry				
Subject Code		B20S101				
Paper	English					
	Hindi					
Max. Marks		100				

Course Objectives:

1. To introduce the basic concepts of polymers, their properties and some of the important applications.
2. To impart knowledge on the basic principles and preparatory methods of nanomaterials.
3. To facilitate the understanding of the laws of photochemistry, photo processes and instrumentation & applications of spectroscopic techniques.
4. To familiarize the operating principles and applications of energy conversion, its processes and storage devices.
5. To inculcate sound understanding of water quality parameters and water treatment techniques.

Course Outcomes:

On completion of the course, the students will be able to:

CO1: Recognize and apply basic knowledge on different types of polymeric materials, their general preparation methods and applications to futuristic material fabrication needs.

CO2: Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.

CO3: Identify and apply suitable spectroscopic technique for material analysis and study different forms of photochemical reactions.

CO4: Recognize different forms of energy resources and apply them for suitable applications in energy sectors.

CO5: Demonstrate the knowledge of water and their quality in using at different industries.

Unit	Syllabus	Periods
UNIT-I	**Polymer Chemistry:** Introduction: Functionality – Degree of Polymerization. Classification of Polymers- Natural and Synthetic, Thermoplastic and Thermosetting. Types and Mechanism of Polymerization: Addition (Free Radical, Cationic, Anionic And Living); Condensation and Copolymerization. Properties of Polymers: Tg, Tacticity, Molecular Weight – Weight Average, Number Average and Polydispersity Index. Techniques of Polymerization: Bulk, Emulsion, Solution and Suspension. Structure, Properties and Uses Of: PE, PVC, PC, PTFE, PP, Nylon 6, Nylon 66, Bakelite, Epoxy; Conducting Polymers – Polyaniline and Poly pyrrole.	**8**
UNIT-II	**Nano chemistry:** Basics-Distinction Between Molecules, Nanomaterials and Bulk Materials; Size-Dependent Properties. Types – Nanoparticle, Nanocluster, Nanorod, Nanowire and Nanotube. Preparation of Nanomaterials: Sol-Gel, Solvothermal, Laser Ablation, Chemical Vapour Deposition, Electrochemical Deposition and Electro Spinning. Characterization – Scanning Electron Microscope and Transmission Electron Microscope – Principle and Instrumentation (Block Diagram). Properties (Optical, Electrical, Mechanical and Magnetic) and Applications of Nanomaterials – Medicine, Agriculture, Electronics and Catalysis.	**9**
UNIT-III	**Photochemistry and Spectroscopy:** Photochemistry: Laws of Photochemistry – Grotthuss-Draper Law, Stark-Einstein Law and Lambert-Beer Law (Derivation and Problems). Photo Physical Processes – Jablonski Diagram. Chemiluminescence, Photo-Sensitization and Photo quenching – Mechanism and Examples. Spectroscopy: Electromagnetic Spectrum – Absorption of Radiation – Electronic, Vibrational and Rotational Transitions. Width and Intensities of Spectral Lines. Atomic Absorption Spectroscopy, UV-Vis and IR Spectroscopy – Principles, Instrumentation (Block Diagram) and Applications.	**11**
UNIT-IV	**Energy Conversion and Storage:** Nuclear Fission – Controlled Nuclear Fission – Nuclear Fusion – Differences Between Nuclear Fission and Fusion – Nuclear Chain Reactions – Nuclear Energy – Light Water Nuclear Power Plant – Fast Breeder Reactor. Solar Energy Conversion – Solar Cells. Wind Energy. Batteries – Types of Batteries – Primary Battery (Dry Cell), Secondary Battery (Lead Acid, Nickel-Cadmium and Lithium-Ion-Battery). Fuel Cells – H2-O2 and Microbial Fuel Cell. Explosives – Classification, Examples: TNT, RDX, Dynamite; Rocket Fuels and Propellants – Definition and Uses.	**13**
UNIT-V	**Water Technology:** Water – Sources And Impurities – Water Quality Parameters: Colour, Odour, pH, Hardness, Alkalinity, TDS, COD and BOD. Boiler Feed Water – Requirement – Troubles (Scale & Sludge, Caustic Embrittlement, Boiler Corrosion and Priming & Foaming. Internal Conditioning – Phosphate, Calgon and Carbonate Treatment. External Conditioning – Zeolite (Permutit) And Ion Exchange Demineralization. Municipal Water Treatment Process – Primary (Screening, Sedimentation	**14**

	and Coagulation), Secondary (Activated Sludge Process And Trickling Filter Process) And Tertiary (Ozonolysis, UV Treatment, Chlorination, Reverse Osmosis).	
	Text Books: 1. Jain P. C., Monica Jain., "Engineering Chemistry", Sixteenth Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2015. 2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012. 3. S.S.Dara, "A text book of Engineering Chemistry", Chand Publications, 2014.	
	Reference Books: 1. Schdeva M V, "Basics of Nano Chemistry", Anmol Publications Pvt Ltd 2. B.Sivasankar, "Instrumental Methods of Analysis", Oxford University Press. 2012. 3. Friedrich Emich, "Engineering Chemistry", Scientific International Ltd. 4. V RGowariker, N V Viswanathan, Jayadev Sreedhar, "Polymer Science", New AGE International Publishers, 2009.	

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	4	1	0	5
Subject Name		Engineering Mathematics-I				
Subject Code		B20S102				
Paper	English					
	Hindi					
Max. Marks		100				

	Course Objective 1. To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions. 2. To introduce the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems. 3. To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics. 4. To familiarize the student with functions of several variables that is essential in most branches of engineering. 5. To develop the essential tool of matrices and linear algebra in a comprehensive manner.	
	Course Outcomes Upon completion of the course, the students will be able to: **CO1:** Explain differential calculus according to certain features. **CO2:** Understand definite & multiple Integral and its applications of certain types of solutions. **CO3:** Define sequences and series and its convergence. **CO4:** Understand vector spaces, Linear Combination and Linear Transformations. **CO5:** Understand matrix and its use in engineering field.	
Unit	**Syllabus**	**Periods**
UNIT-I	**Calculus**: Rolle's theorem, Mean Value theorems, Expansion of functions by Maclaurin's and Taylor's theorem for one variable; Taylor's theorem for function of two variables, Partial Differentiation, Maxima & Minima	**8**

	(two and three variables), Method of Lagrange's Multipliers.	
UNIT-II	**Calculus**: Definite Integral as a limit of a sum and Its application in summation of series; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Multiple Integral, Change the order of the integration, Applications of multiple integral for calculating area and volumes of the curves.	**12**
UNIT-III	**Sequences and series:** Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.	**11**
UNIT-IV	**Vector Spaces: Vector** Space, Vector Sub Space, Linear combination of Vectors, Linearly Dependent, Linearly Independent, Basis of a Vector Space, Linear Transformations.	**13**
UNIT-V	**Matrices:** Rank of a Matrix, Solution of Simultaneous Linear Equations by Elementary Transformation, Consistency of Equation, Eigen Values and Eigen Vectors, Diagonalization of Matrices, Cayley-Hamilton theorem and its applications to find inverse.	**10**
	Textbooks: 1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, latest edition. 2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.	
	Reference books 1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010. 2. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005. 3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002. 4. B. S. Grewal, "Higher Engineering Mathematics", 43rd edition, Khanna publishers, 2017.	

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SCHOOL OF ENGINEERING

SYLLABUS

UG

Class		**B.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**I/I**	**4**	**1**	**-**	**5**
Subject Name		**Technical English**				
Subject Code		**B20S103**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objectives:

1. The course intends to build the required communication skills of the students so as to communicate effectively in real-life situations like starting a talk and be comfortable using English language.
2. It aims at teaching students to appreciate English language through the study of scientific, creative, and academic text.
3. The course is designed to acquaint students with structure of English language used in literature, functional varieties, figurative language, and verbal concomitance.
4. The students are expected to enrich their knowledge of language, culture, and ethics through this course.

Course Outcomes:

Learners should be able to:

CO1: Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
CO2: Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
CO3: Read different genres of texts adopting various reading strategies.
CO4: Listen/view and comprehend different spoken discourses/excerpts in different accents.
CO5: Implement professional work habits, including those necessary for effective collaboration and cooperation with others.

Unit	Syllabus	Periods
UNIT-I	**Introduction to Language & Linguistics:** An Introduction to Linguistics, IPA, English Phonetic Symbols/Sign & Sounds, Place & Manner of Articulation.	**8**
UNIT-II	**Communication:** Communication: Approaches, Elements, Types, Process, Models; Management Communication (Levels of Communication) and Grapevine Communication, Verbal and Nonverbal Communication; Barriers to Communication; Johari Communication Window.	**10**
UNIT-III	**Application of Linguistic Ability:** Listening: Factors Affecting Listening and Improving Listening, Speaking: Making Speeches, Presentation, Group Discussion, Meeting, Interview, Debate.	**11**
UNIT-IV	**Grammar & Vocabulary:** Grammar: Parts of Speech, Subject-verb Agreement, Active and Passive Voice, conditional sentences. Vocabulary: Using the dictionary and thesaurus, word formation, prefix & suffix, idioms, phrasal verbs.	**12**
UNIT-V	**Report Writing:** Reading Comprehension: Stories, Passages, Poetry and Scientific Text Writing: Essentials of good writing, Technical Descriptions of Simple Engineering Objects; Formal (Application, Email, CV, Résumé, Memo, Report writing, note making, precise) *****Material for story and poetry is to be selected by concerned teacher in class.	**14**
	Text-Book:- 1. Effective Business communication – Tata McGraw Hill by Rizvi. 2. Business Communication – OUP, Tata McGraw by Meenakshi Raman.	
	Reference Books: - 1. Technical Communication- By Meenakshi Raman, OUP. 2. Understanding Human Communication — By Ronald Alderman by OUP. 3. Communication Skills for Engineers – Pearson Education by Sunita Mishra. 4. Practical English Grammar by Thomson Martinet – Oxford University Press. 5. A Handbook of Language laboratory by Cambridge University Press.	

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SCHOOL OF ENGINEERING

SYLLABUS

UG

Class		**B.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**I/I**	**4**	**1**	**-**	**5**
Subject Name		**Basic Electrical & Electronics Engineering**				
Subject Code		**B20S104**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objectives:

1. To impart the basic knowledge about the D.C circuits and its applications.
2. To inculcate the understanding about the AC fundamentals.
3. To convey the basic knowledge of magnetic circuits and its terminology.
4. Highlight the importance of transformers in transmission and distribution of electric power.
5. To understand the working of D C Machine.
6. To know about various electronic circuits and its importance.

Course Outcomes:

After the completion of the course, the student will be able to –

CO1: Solve DC & AC circuits by applying fundamental laws & theorems.

CO2: Analyze the response of linear electrical and magnetic circuits for given input.

CO3: Explain the working principle, construction, applications of rotating electrical machines.

CO4: Explain the working principle, constructional details, losses & applications of single phase transformer.

CO5: Select the logic gates for various applications in digital electronic circuits. Explain characteristics of Diode and Transistor.

Unit	Syllabus	Periods
UNIT-I	**D.C. Circuits Analysis:** Voltage and Current Sources: Dependent and independent source, Source conversion, Kirchhoff's Law, Mesh and Nodal analysis. Network theorems: Superposition theorem, Thevenin's theorem & Norton's theorem and their applications.	**8**
UNIT-II	**Single-phase AC Circuits**: Generation of sinusoidal AC voltage, definitions: Average value, R.M.S. value, Form factor and Peak factor of AC quantity, Concept of Phasor, analysis of R-L, R-C, R-L-C Series and Parallel circuit, Power and importance of Power factor.	**10**
UNIT-III	**Magnetic Circuits**: Basic definitions, AC excitation in magnetic circuits, self-inductance and mutual inductance , Induced voltage, laws of electromagnetic Induction, direction of induced E.M.F. Flux ,MMF and their relation, analysis of magnetic circuits.	**10**
UNIT-IV	**Single-phase Transformer & Rotating Electrical Machines:** Single phase transformer, Basic concepts, construction and working principal, Ideal Transformer and its phasor diagram at No Load, Voltage, current and impedance transformation, Equivalent circuits and its Phasor diagram, voltage regulation, losses and efficiency, testing of transformers, Construction & working principle of DC and AC machine.	**12**
UNIT-V	**Digital Electronics**, **Devices & Circuits:** Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, Demorgan's theorem, Logic gates- symbolic representation and their truth table, Introduction to semiconductors, Diodes, V-I characteristic, Bipolar junction transistors and their working, Introduction to CB, CE & CC transistor configurations.	**13**
	Text Book(s) 1. Basic Electrical and Electronics Engineering, Tata McGraw Hill - D.P. Kothari & I.J. Nagrath. 2. Basic Electrical Engineering, B.L. Thareja S. Chand Publication.	
	Reference Books: 1. Basic Electrical and Electronics Engineering, Tata McGraw Hill – V N Mittle & Arvind Mittal 3. Electrical Machinery- A.E. Fitzgerald, C. Kingsley and Umans - TMH 4. Principles of Electrical Engineering- Vincdent Del Toro- Prentice Hall. 5. Basic Electrical engineering -A,E. Fitzgerald, Higginbotham and Grabel -TMH 6. Integrated Electronics- Millmann & Halkias 7. Electronics Devices & circuits- Sanjeev Gupta, Dhanpat Rai Publication 8. Basic Electrical and Electronics Engineering, Tata McGraw Hill - D.C Kulshreshtha.	

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SCHOOL OF ENGINEERING

SYLLABUS

UG

Class		**B.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**I/I**	**4**	**1**	**-**	**5**
Subject Name		**Engineering Graphics**				
Subject Code		**B20S105**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

	Course Objective: 1: To inculcate the imagination and mental visualization capabilities for interpreting the geometrical details of common engineering objects. 2: To impart knowledge about principles/methods related to projections of one-, two- and three-dimensional objects. 3: To learn to take data and transform it into graphic drawings.	
	Course Outcomes: Upon completion of the course, the students will be able to: **CO 1**: Introduction to engineering design and its place in society. **CO 2**: Exposure to the visual aspects of engineering design. **CO 3**: Exposure to engineering graphics standards. **CO 4:** Exposure to computer-aided geometric design. **CO 5:** Exposure to creating working drawings.	
Unit	**Syllabus**	**Periods**
UNIT-I	Introduction and scale: Basics of instruments, Lettering and dimensioning, Plane geometrical constructions. Plain and diagonal scale - Representative factor, Unit conversion and Exercises based on linear, area, volume and speed. Scale of chord. Engineering curves: Cycloidal curves - cycloid, epicycloid and hypocycloid curve, tangent and normal. Spiral curves - Archimedean and logarithmic spiral curves. Tangent & normal on the curves. Involute curve. Conic sections: Construction of ellipse, parabola, hyperbola by different methods.	**11**

UNIT-II	Projection of points: Introduction, types of projections, quadrant system, positions of points and Exercise. first and third angle projection. Projection of straight line: Introduction, Orientation of a straight line, Traces of a line and Exercise.	**10**
UNIT-III	Projection of planes and solids: Introduction, Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.	**11**
UNIT-IV	Section of solids: introduction, Types of section planes and Anti-section and Exercise. Development of surfaces of right solids: Introduction, Methods of development & anti- development and Exercise. Intersection of cylinders: Introduction, methods of developments, intersection of cylinder by another cylinder and exercise.	**12**
UNIT-V	Isometric projections: Introduction, isometric scale, isometric axis, isometric view and isometric projections from orthographic views, orthographic views from pictorial view and exercise. Computer Aided Drafting using Auto CAD: Introduction, software's basic commands, transformation and editing commands.	**11**
	Text Books: 1. Engineering Drawing by N. D. Bhatt, Charotar Publication Pvt.Ltd. 2. Engineering Drawing by P.S. Gill, S. K. kataria & sons, Delhi 3. Engineering Drawing by Basant Agrawal& C. M. Agrawal, Tata McGraw Hill Education Pvt. Ltd.	
	Reference Books 1. Engineering Graphics by K. Venugopal, New Age International Publication, India. 2. Narayana, K.L. & P Kannaiah Shah, M.B. & Rana B.C.	

SYLLABUS

UG

Class		**B.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**I/I**	**0**	**0**	**2**	**1**
Subject Name		**Manufacturing Practices Lab**				
Subject Code		**B20S106**				
Paper	**English**					
	Hindi					
Max. Marks		**50**				

List of Experiments:

1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
2. To study different types of machine tools (lathe, shaper or planer or slotter, milling, drilling machines).
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practicle.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable for butt welding and lap welding.
7. To perform pipe welding.
8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
9. To prepare simple engineering components/ shapes by forging.
10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
11. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/planner.
12. To prepare a job involving side and face milling on a milling machine.

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	-	-	2	1
Subject Name		Engineering Chemistry Lab				
Subject Code		B20S107				
Paper	English					
	Hindi					
Max. Marks		50				

OBJECTIVES:

1. To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper.
2. To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
3. To demonstrate the analysis of metals and polymers by spectroscopy and viscometry methods.

OUTCOMES:

On completion of the course, the students will be able to:

CO1: Analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.

CO2: Determine the amount of metal ions through volumetric and spectroscopic techniques.

CO3: Determine the molecular weight of polymers by viscometric method.

CO4: Quantitatively analyse the impurities in solution by electroanalytical techniques.

CO5: Design and analyse the kinetics of reactions and corrosion of metals.

LIST OF EXPERIMENTS:

1. Estimation of HCl using Na2CO3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler‟s method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline/ thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
11. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
12. Pseudo first order kinetics-ester hydrolysis.
13. Corrosion experiment-weight loss method.
14. Phase change in a solid.

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	-	-	2	1
Subject Name		Technical English Lab				
Subject Code		B20S108				
Paper	English					
	Hindi					
Max. Marks		50				

Language Laboratory: The objective of the language lab is to expose students to a variety of listening and speaking drills. This would especially benefit students who are deficient in English and it also aims at confidence building for interviews and competitive examinations. The Lab is to cover following syllabus.

1. Communication lab.
2. Listening skills.
3. Speaking skills. (A) Phonetic symbols, pronunciation.
   (B). Conversation: telephonic, face to face, formal and informal situations
4. Oral presentation.

Course Outcomes:

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

CO1: Speak clearly effectively and appropriately in a public forum to a variety of audiences and purposes. (LOT1)

CO2: Prepare oral presentations and arguments within the Engineering Profession effectively. (LOT2)

CO3: Demonstrate knowledge and comprehension of major text and traditions in language as well as its social, cultural, and historical context. (LOT3)

CO4: Read a variety of Text critically and analytically so as to demonstrate in writing and/or speech the interpretation of those texts. (HOT4)

CO5: Interpret text written in English assessing the results in written and oral arguments using appropriate material for support. (LOT3)

CO6: Implement professional work habits, including those necessary for effective collaboration and cooperation with others. (HOT4)

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	-	-	2	1
Subject Name		Basic Electrical & Electronics Engineering Lab				
Subject Code		B20S109				
Paper	English					
	Hindi					
Max. Marks		50				

Course Outcomes:

After the completion of the lab, the student will be able to –

CO 1. Verify circuit theorems.
CO 2. Perform tests on transformer for determination of losses, efficiency & polarity.
CO 3. Demonstrate the constructional features of electrical machines
CO 4. Acquire teamwork skills for working effectively in groups
CO 5. Prepare an organized technical report on experiments conducted in the laboratory.

LIST OF EXPERIMENTS:

1. To verify Kirchhoff's Current Law & Kirchhoff's Voltage Law.
2. To verify Superposition Theorem
3. To determine resistance & inductance of a choke coil.
4. To determine active & reactive power in a single phase A.C circuit.
5. To determine voltage ratio & current ratio of a single phase transformer.
6. To determine the polarity of a single phase transformer.
7. To perform open circuit & short circuit test on a single phase transformer.
8. To study multimeter & measure various electrical quantities
9. To study of constructional details of DC machine.
10. To determine the V-I characteristics of diode in forward bias & reverse bias condition.

SYLLABUS

UG

Class		**B.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**I/I**	**-**	**-**	**2**	**1**
Subject Name		**Engineering Graphics Lab**				
Subject Code		**B20S110**				
Paper	**English**					
	Hindi					
Max. Marks		**50**				

Course Outcomes:

After successful completion of this course students will be able to:

CO1: Sketch Engineering objects using hand tools.
CO2: Interpret the geometrical detail of drawing.
CO3: Solve traditional geometric problems.
CO4: Generate engineering drawings from computer models.
CO5: Create sectional views.
CO6: Perform design projects.

Laboratory Work:

List of Experiments:

1. To prepare sheet of Plain scale, diagonal scale and Scale of chord.
2. To prepare sheet of Cycloidal curves.
3. To prepare sheet of Projection of points and lines.
4. To prepare sheet of Projection of Planes.
5. To prepare sheet of Projection of Solids.
6. To prepare sheet of Section of Solids.
7. To prepare sheet of Development of Surfaces.
8. To prepare sheet of Isometric and Intersection of Solids.

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	4	1	-	5
Subject Name		Engineering Physics				
Subject Code		B20S201				
Paper	English					
	Hindi					
Max. Marks		100				

	Course Objective: 1. Enable the students to become familiar with the concepts of Modern Engineering Physics 2. Develop and understanding of complex topics of Quantum Physics, Wave Optics, Nuclear Physics, Solid state Physics and Laser Systems so that they could be applied to the engineering and applications. 3. Assist the students develop numerical solving techniques to enhance with their computational abilities.	
	Course Outcomes: **CO1**: Acquire knowledge of Quantum and Nuclear Physics along with its application. **CO2**: Students will be able to understand the wave nature: interference, diffraction and polarization phenomenon of light. **CO3**. To understand semiconductors devices and their working along with their applications. Learn fundamental of superconductors. **CO4**. Learn about the electronic material, its uses in different devices. Understand properties, synthesis and applications of nanoparticles. **CO5**. Learn and understand Lasers and their applications, Working, uses and applications of Fibre optics.	
Unit	**Syllabus**	**Periods**
UNIT-I	**Quantum & Nuclear Physics:** Origin of quantum hypothesis, de-Broglie matter wave concept, Davisson - Germer experiment, Concept of Group and Phase velocities & their relationship. Heisenberg's Uncertainty principle with elementary proof and applications (determination of	**10**

	position of a particle by a microscope, non-existence of electron in nucleus, diffraction of an electron beam by a single slit), Compton effect, Physical Significance of Schrodinger Wave function and its properties. Nuclear structure & nuclear properties, Nuclear fission and Nuclear fusion process. Idea of Linear Accelerators like LINEAC, Cyclotron, Betatron, Greiger-Muller Counter.	
UNIT-II	**Wave Optics:** Interference: Fresnel's bi-prism, Interference in thin films (due to reflected and transmitted light), Newton's rings and Michelson's interferometer experiments. Diffraction at single slit, Resolving power of grating and prism. Concept of polarized light, idea about circular, elliptical & plane polarization, Brewster's laws, Double refraction, Nicol prism.	**10**
UNIT-III	**Solid State Physics & Superconductivity**: Introduction to Lorentz & Drude Classical Free electron theory & limitations. Concept of Effective mass, Fermi-Dirac statistical distribution function, Introduction to Semiconductor theory, Fermi level for Intrinsic and Extrinsic Semiconductors, PN, Zener & Tunnel diodes, Hall effect. Introduction to Super-conductivity, Idea of Type I and Type II Superconductors, Meissner Effect.	**11**
UNIT-IV	**Electronic materials and applications:** Introduction to electronic materials, Solar cells, fabrication and characterization techniques, Photodiode, Laser diode, Light Emitting diode, LCD their construction, working and applications. Introduction to Nanomaterials, Properties of Nanomaterials, Synthesis of nanoparticles & applications of nanotechnology.	**11**
UNIT-V	**Laser Physics and Fiber Optics**: Introduction to Laser Theory, Laser: Stimulated and spontaneous processes, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Coherence, directionality and monochromaticity, Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers. Introduction to Holography. Fundamental idea about optical fiber, types of fibers, acceptance angle & cone, numerical aperture, V-number, Types of losses & various Application of optical fibers.	**12**
	Text-Book: 1. Engineering Physics by S.L. Gupta and Sanjiv Gupta (Dhanpat Rai Pub.) 2. A Textbook of Engineering Physics by Navneet Gupta and S.K. Tiwary (Dhanpat Rai Pub).	
	Reference-Books: 1. Engineering Physics by Mallik and Singh (Mc Graw Hill Pub). 2. Laser: Principles and Applications by K.R. Nambiar (New Age Int. Pub).	

SYLLABUS

UG

Class		**B.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**I/I**	**4**	**1**	**0**	**5**
Subject Name		**Energy, Ecology, Environment & Society (EEES)**				
Subject Code		**B20S202**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objectives:

1. To create awareness about global energy status, climate issues and sustainable development for development of society using new rand renewable energy resources for power needs.
2. To generate an understanding of human relationships, perceptions and policies towards environment and focus on design and technology for improving environmental quality.
3. To develop moral values and morals to conduct efficiently and ethically in society.

Course outcomes:

After successfully completing this course the students will be able to:

CO1: Describe various energy resources, their conversion to electrical power and role in technological & economic development.

CO2: Update with national/international power status and renewable power development targets & missions.

CO3: Recognize the impact of pollution on the ecosystem and control policies adopted at national/international levels.

CO4: Illustrate the concepts of ecosystems and their conservation.

CO5: Solve practical problems of society in a sustainable and ethical manner. Fulfill professional duties keeping in mind the environmental safety, health, and welfare of public.

Unit	Syllabus	Periods
UNIT-I	**Sources of energy**: Renewable and non-renewable energy, current Indian and global scenario of energy, state wise energy consumption, role of energy in economic and social development and social transformation. **Energy Polices:** National level and State level policy and International policy of G-8, G-20, OPEC and European countries, solar energy policy of India, National Solar mission energy policy issues. Energy securities and challenges in Indian context.	**8**
UNIT-II	**Energy conversion**: Solar Energy, sun-earth angle, solar water heating, concentrated solar power, PV power: roof top; off Grid and on grid, Hydro, wind, biomass, geothermal, tidal and nuclear energy, Fossil fuels, thermal power station basic concepts. Per kilowatt hr cost of energy produced from various energy sources and its future prospects, business opportunities in various non-conventional sources.	**9**
UNIT-III	**Ecology**: Ecosystems, concept, components, types, Atmosphere, hydrosphere, lithosphere, biosphere, cycles in Ecosystem, Water, Carbon, Nitrogen. Biodiversity, threats and conservation, Producers, composers and decomposers, Energy and matter flow, Ecological succession, Food chains webs and ecological pyramids, Characteristics, structures and functions of ecosystems such as Forest, Grassland, Desert, Aquatic ecosystems. Community ecology- Characteristics, frequency, life forms, and biological spectrum, Ecosystem structure, Biotic and a-biotic factors, food chain, food web, ecological pyramids; Population ecology.	**12**
UNIT-IV	**Environment:** Air pollution, causes, classifications, adverse effects, Greenhouse gases and effect, their major concerns, present status, emission from automobile, power, infrastructure, agriculture and transportation, environmental security. Global warming causes and effects, acid rain, ozone layer depletion, climate change, its model, impact on human health, national and international impact of climate change, Kyoto protocol, national and additional measures; flexible mechanism for reduction of carbon, clean development mission, joint implementation programme, carbon credit, carbon trading, emission trading, Voluntary Emission Rights (VER), Certified Emission Reductions (CER), and emission reduction unit (ERU), Indian initiatives of reduction in greenhouse gases. Environmental ethics.	**13**
UNIT-V	**Values and ethics**: Definition, Sources, and approaches to ethics, Social values and individual attitudes, Work ethics and work values, philosophical and Social ethics, human values and morals, business ethics, self-concept and Johari Window, emotional intelligence, social intelligence, self-development, character strengths and virtues, Impact of waste on society, management of e-waste.	**12**
	Text Books: **1.** Cunninghan WP and MA; Principles of Environment Sciences; Tata McGraw Hill (TMH). 2. Pandey, S.N. & Mishra, S.P. Environment & Ecology, 2011,Ane Books, Pvt. Ltd, New Delhi. 3. Svakumar; Energy Environment & Ethics in Society; TMH. 4. Bukhootsow, B., Energy Policy and Planning, Prentice Hall of India, New Delhi, 2003. 5. Jose Goldenberg, Thomas Johanson, and Reddy, A.K.N., Energy for Sustainable World, Wiley Eastern, 2005. 6. Charles E. Brown, World Energy Resources, Springer Publication,	

	New York, 2002. 7. Culp, A.W., Principles of Energy Conversion, McGraw Hill New York, 2004. 8. Bala Krishnamoorthy; “Environmental management”; PHI. 9. Gerard Kiely, “Environmental Engineering” TMH.	
	Reference Books: 1. Bharucha Erach, Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmadabad, 2002. 2. Chakraborty, S.K., Values and Ethics for Organizations, Theory and Practice, Oxford University Press, New Delhi, 2001. 3. Leary M.R., “The Curse of Self: Self-awareness, Egotism and the Quality of Human Life”, Oxford University Press. 2004. 4. Louis P. P., “The Moral Life: An Introductory Reader in Ethics and Literature”, Oxford Univ. Press. 2007.	

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	4	1	-	5
Subject Name		Basic Computer Engineering				
Subject Code		B20S203				
Paper	English					
	Hindi					
Max. Marks		100				

	Course Objectives: 1. To develop comprehensive knowledge about the fundamental principles and concepts of basic computer engineering. 2. To develop competencies for the design, coding and debugging of computer programs. 3. To understand fundamentals of operating system concepts & database management system. 4. To acquire the basic knowledge of computer networks and its application & internet technology.	
	Course Outcomes: Upon completion of the practical course, the students will be able to: **CO1:** Perform DOS Internal and External Command. **CO2**: Create Document File. **CO3:** Create Excel Sheet. **CO4**: Create Presentation File. **CO5:** Write Program in C++, perform database command and design Web page using HTML	
Unit	**Syllabus**	**Periods**
UNIT-I	**Basics of Computer:** Introduction, Generation of Computers, Classification of Computers, Hardware, Software: types of software, Memory Representation, RAM, ROM, Hard disk. **Number System & Conversion:** Decimal, Binary, Octal, Hexadecimal.	**8**

UNIT-II	**Basics of Programming:** Introduction, History, Generations of Programming Languages, Types of Programming Language, Flow Charts. **Fundamental of C++ programming**: Data types, Operators, Writing and Executing C++ Programs, Standard I/O Functions, Goto Statement, Breaks and Continue Statement, Conditional Statements and Loops.	**9**
UNIT-III	**Functions:** Introduction, Function Prototypes, Passing Values to Functions, Recursive Functions. **Arrays:** Declaration and Initialization, Manipulating Array Elements, Multidimensional Arrays, String. **Pointers and Structure:** Introduction, Declarations, Double Pointer, Pointer to Function, function Returning Pointer, Pointer to Array, Array of Pointers, Dynamic memory Allocation using Malloc and Calloc functions, Structures, Arrays of Structures, Pointers to Structures, Union.	**12**
UNIT-IV	**Operating System Concepts:** Introduction, Functions of Operating System, Types of Operating System, popular Operating Systems. **Database Management System:** Introduction to DBMS, Data models, Applications of DBMS, Architecture of Database management system, DBA, DBMS keys, Data Definition Language, Data manipulation Language.	**13**
UNIT-V	**Computer Network & Internet Technology:** Introduction, Types of Network, Internetworking device, Network Topologies, E-commerce, WWW and Web browser. **HTML:** Introduction, Working with Text, Lists, Table, Frames, Hyperlinks, Images, Multimedia, Forms and Controls.	**11**
	Text Books: 1. "Fundamental of Computer Engineering", E. Balagurusamy, Tata McGraw Hill Education Pvt. Ltd. 2. "Let Us C++", Yashavant P. Kanetkar, BPB Publications.	
	Reference Book: 1. "Operating System Concepts", Galvin, Wiley. 2. "Computer Fundamentals and C Programming", Sumitabha Das, McGraw Hill Education.	

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	4	1	-	5
Subject Name		Basic Mechanical Engineering				
Subject Code		B20S204				
Paper	English					
	Hindi					
Max. Marks		100				

	Course Objectives: To make the students: **1.** To develop the fundamentals of Engineering materials, measurement and reciprocating machines. **2.** To develop an ability to understand the Thermodynamic laws, steam generator and reciprocating machines for solving engineering problems. **3.** To demonstrate Engines and Boiler fundamentals using models.	
	Course Outcomes: After successful completion of this course students will be able to: **CO1:** Describe the fundamentals of Measurement device and engineering materials. **CO2:** Summarize fundamental techniques and process used in Steam generator and Reciprocating machines. **CO3:** Solve the various engineering problems by formulate and proper assumptions for practice. **CO4:** Analyze the various thermal properties of steam. **CO5:** Evaluate the problems of Steam Generator, Thermodynamics, Steam and I.C. engines. Generate the skills to demonstrate steam Generator and reciprocating machine in depth.	
Unit	**Syllabus**	**Periods**
UNIT-I	**Materials:** Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; rain	**8**

	diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.	
UNIT-II	**Measurement:** Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainty analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lathe drilling, milling and shaping machines.	**9**
UNIT-III	**Fluids:** Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernoulli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.	**11**
UNIT-IV	**Thermodynamics:** Zeroth, First, second and third law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and induced draught, calculation of chimney height. Refrigeration, vapour absorption and compression cycles, coefficient of performance (COP).	**13**
UNIT-V	**Reciprocating Machines:** Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol and diesel IC engines.	**10**
	Text Books: 1. Narula; Material Science; TMH. 2. Agrawal B & CM; Basic Mechanical Engineering; TMH. 3. Nag PK, Tripathi et al; Basic Mechanical Engineering; TMH.	
	Reference Books: 1. Sawhney GS; Fundamentals of Mechanical Engineering; PHI. 2. Nakra and Chaudhary; Instrumentation and Measurement; TMH. 3. Nag PK; Engineering Thermodynamics; TMH. Ganesan; Combustion Engines; TMH.	

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	4	1	-	5
Subject Name		Basic Civil Engineering & Mechanics				
Subject Code		B20S205				
Paper	English					
	Hindi					
Max. Marks		100				

	Course Objectives: 1. To understand the utility of various types of building materials. 2. To understand the location, construction detail and suitability of various building elements. 3. To determine the location of object on ground surface. 4. To stabilize the position of various object. 5. To understand the effects of system of forces on rigid body in static conditions. 6. Analysis of determinate structure (beam &truss).	
	Course Outcomes: Upon completion of the course, the students will be able to: **CO1:** Explain concepts and terminologies of building materials, surveying and mechanics. **CO2:** Apply various methods for surveying and mechanics. **CO3:** Determine the location, area and volume of objects on ground surface. **CO4:** Solve the problems of surveying and mechanics by using various methods. **CO5:** Analyse the effects of system of forces on rigid bodies in static conditions.	
Unit	**Syllabus**	**Periods**
UNIT-I	Building Materials: Stones, bricks, cement, timber - types, properties, test & uses, Introduction of concrete properties & Laboratory tests on concrete, curing of concrete and mortar Materials.	**8**
UNIT-II	Surveying & Positioning: Introduction to surveying, Survey stations, Measurement of distances- conventional and EDM methods, Measurement of directions by different methods, Measurement of elevations by different	**9**

	methods, reciprocal leveling.	
UNIT-III	Mapping & Sensing: Mapping details and contouring, Plane tables and related devices. Introduction of theodolite. Measurement of areas and volumes, application of measurements in quantity computations, Introduction of remote sensing and its applications.	**11**
UNIT-IV	Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and non-concurrent co- planner forces, free body Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses, method of joints, method of Sections. Frictional force in equilibrium problems.	**13**
UNIT-V	Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment of Inertia of Composite section, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment diagram for cantilever & simply supported beam with concentrated, distributed load and Couple.	**14**
	Text Books: 1. Surveying, Vol. – 1, Punmia B.C., Laxmi Publications, 17thedition, 2016. 2. Building Material, B. C. Punmia, Laxmi Publications, 2016. 3. A textbook of Engineering Mechanics, D. S. Kumar, Katsons Publications, 2013.	
	Reference Books: 1. Basic Civil Engineering, S. Ramamrutam & R. Narayan, Dhanpat Rai Pub., 3rd edition, 2013. 2. Applied Mechanics, Prasad I.B., Khanna Publication 17th edition, 1996. 3. Surveying, Duggal, Tata McGraw Hill New Delhi, 4th edition, 2013. 4. Engineering Mechanics-Statics & Dynamics, R.C. Hibbler, Pearson Publications, 14th edition, 2015. 5. Engineering Mechanics - statics dynamics, A. Boresi & Schmidt, Cengage learning, 1st edition, 2008. 6. Applied Mechanics, R.K. Rajput, Laxmi Publications, 3rdedition, 2016.	

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	0	0	2	1
Subject Name		Language Lab & Seminar				
Subject Code		B20S206				
Paper	English					
	Hindi					
Max. Marks		50				

Course Objective:

1. The course intends to build the required communication skills of the students.
2. The course seeks to facilitate the use of English Language in daily discourse.
3. Students will develop mand their listening and speaking habit.
4. Students will groom their personality proper application of behavioral skills.

Syllabus:

1. Public speaking and oral skills with emphasis on conversation practices, role plays, extempore, speech, JAM (Just a Minute Sessions). Describing objects and situation, giving direction, and telephonic etiquette.
2. Reading comprehension, intensive reading skills, rapid reading, and reading aloud.
3. Translation from English to Hindi and *vicé versa*.
4. Oral presentations. preparation and delivery.
5. Debates and group discussion.

Laboratory Part

1. Sessions in Language Laboratory using Software Words Worth (08 Lectures).
2. Debate (08 Lectures).
3. Communication (08 Lectures).
4. Reserved. (08 Lectures).
5. Extempore and Just a Minute Sessions (06 lectures).
6. Listening (06 Lectures).
7. Reading Comprehension (06 Lectures).

Reference Books

1. Murphy, Raymond. Intermediate English Grammar, New Delhi, Cambridge University Press. ,2009.
2. McCarthy, Michael & Felicity O' Dell. English Vocabulary in Use, New Delhi, Cambridge University Press ,2010.
3. M. Fowler's Modern English Usage, New Delhi, OUP, 2004.

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	-	-	2	1
Subject Name		Engineering Physics Lab				
Subject Code		B20S207				
Paper	English					
	Hindi					
Max. Marks		50				

List of Experiments

1. To determine the radius of curvature of a Plano Convex Lens by using Newton's Ring method.
2. To determine the wave length of yellow light by using plane transmission grating.
3. To determine the band gap in a semiconductor.
4. To determine the resolving power of telescope.
5. To study and plot the forward and reverse bias characteristics of P-N Junction diode.
6. To study and plot the forward and reverse bias characteristics of Zener diode.
7. The angle of deviation of Red and violet color light using calcite prism with help of spectrometer.
8. Determine the value of 'g'(acceleration due to gravity) with the help of compound pendulum.
9. To determine the coefficient of viscosity of a liquid by Stoke's method.
10. To Find out Angle of polarization of sugar solution by using polarimeter.
11. To study the depression of a cantilever and hence to determine the young's modulus of material of beam.
12. To determine the dispersive power of prism using mercury lamp and spectrometer.

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	-	-	2	1
Subject Name		Basic Computer Engineering Lab				
Subject Code		B20S208				
Paper	English					
	Hindi					
Max. Marks		100				

List of Experiments:

1. Study and practice of Internal & External DOS commands.
2. Creation and editing of Text files using MS- word.
3. Creation and operating of spreadsheet using MS-Excel.
4. Creation and editing power-point slides using MS- power point.
5. WAP to illustrate Arithmetic expressions. (Implement the addition, multiplication, Subtraction and division).
6. WAP to illustrate Arrays. (Implement the addition of array elements).
7. WAP to illustrate functions. (Implement the table generator).
8. WAP to illustrate Function overloading
9. WAP to illustrate Recursive Function.
10. WAP to illustrate Pointer to Function
11. Study of the DDL and DML using Mysql.
12. Study of the Study of HTML Element.
13. Design the HTML Form for Student Registration.

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	-	-	2	1
Subject Name		Basic Mechanical Engineering Lab				
Subject Code		B20S209				
Paper	English					
	Hindi					
Max. Marks		50				

Lists of Experiments:

1. Study of simple vertical boilers.
2. Study of Locomotive boilers.
3. Study of Babcock and Wilcox boilers.
4. Study of Lancashire, Cornish and Cochran boilers.
5. Study of boiler mounting and accessories.
6. Study of 2 stroke diesel and petrol engines.
7. Study of 4 stroke diesel and petrol engines.
8. Study of simple steam engines.
9. Study of Lathe machine.
10. Study of Vernier and Micrometer.

SYLLABUS

UG

Class		B.TECH.	L	T	P	C
Semester/Year		I/I	-	-	2	4
Subject Name		Basic Civil Engineering & Mechanics Lab				
Subject Code		B20S210				
Paper	English					
	Hindi					
Max. Marks		50				

List of Experiments:

1. Study of various types of chain and tapes.

2. Measurement of distance involving direct and indirect ranging.

3. Chain and tape survey of given area.

4. Study of prismatic and surveyors compass.

5. Measurement of direction by prismatic compass.

6. Calculation of distance between two in accessible points by prismatic compass.

7. Study of dumpy level, levelling staff and level field book.

8. Exercise of differential levelling and flying levelling.

9. Study of various types of a transits theodolite.

10. Measurements of horizontal angle by repetition method.

11. Determining the resultants force of coplanar concurrent and non-concurrent system of forces by graphical method.

12. Determine forces in members of a perfect frame by graphical method.