Revised F.Y. B.Tech. Curriculum from Academic year academic year 2014-15

SGGS INSTITUTE OF ENGINEERING & TECHNOLOGY, VISHNUPURI, NANDED

STRUCTURE –A

Revised F.Y. B.Tech. Curriculum Structure, Academic year 2014-15 (for About 50% students)

Semester-I					
Course Code	Course Title	Lectures	Tutorials	Practical	Credits
UMA101	Engineering Mathematics –I	4	1	0	5
UES101	Engineering Physics	4	0	2	5
UCS101	Introduction to Computers & Programming	3	0	2	4
UME101	Elements of Mechanical Engineering	2	0	0	2
UPR102	Engineering Drawing	2	0	4	4
UWS101	Workshop Practice	-	-	2	1
	Total	**15**	**01**	**10**	**21**
Semester-II					
Course Code	Course Title	Lectures	Tutorials	Practical	Credits
UMA102	Engineering Mathematics –II	4	1	0	5
UES102	Engineering Chemistry	4	0	2	5
UEE101	Elements of Electrical Engineering	4	0	2	5
UCW102	Engineering Mechanics	3	1	2	5
UCW01	Environmental Studies (Audit)	3	0	0	0
	Total	**18**	**02**	**06**	**20**

STRUCTURE –B

(Revised F.Y. B.Tech. Curriculum Structure, Academic year 2014-15) (for About 50% students)

Semester-I					
Course Code	Course Title	Lectures	Tutorials	Practical	Credits
UMA101	Engineering Mathematics –I	4	1	0	5
UES102	Engineering Chemistry	4	0	2	5
UEE101	Elements of Electrical Engineering	4	0	2	5
UCW102	Engineering Mechanics	3	1	2	5
UCW01	Environmental Studies (Audit)	3	0	0	0
	Total	**18**	**02**	**06**	**20**
Semester-II					
Course Code	Course Title	Lectures	Tutorials	Practical	Credits
UMA102	Engineering Mathematics –II	4	1	0	5
UES101	Engineering Physics	4	0	2	5
UCS101	Introduction to Computers & Programming	3	0	2	4
UME101	Elements of Mechanical Engineering	2	0	0	2
UPR102	Engineering Drawing	2	0	4	4
UWS101	Workshop Practice	-	-	2	1
	Total	**15**	**01**	**10**	**21**

CONTENTS

UMA 101 Engineering Mathematics – I (Linear Algebra)

	Teaching Scheme:			**Examination Scheme:**				
	Lectures	4 hrs/week	4 hrs/week	Theory Mid Term : 30 marks, End Sem. Exam: 70 marks				
	Tutorial	1 hr/week	1 hr/week					
	Credits	5	5					
	Course Objectives:							
	• To introduce fundamental concept of linear algebra, system of equations and the methods to solve the system of equations and their applications in the engineering field.							
	• To teach methods and theorems and enable them to solve engineering and scientific problems.							
	• This course of mathematics will meet the requirements and the expectations of the engineering students.							
Unit 1	Introduction to system of linear equations, Gaussian elimination method.							
Unit 2	Introduction to vector spaces, Norm of a vector, vector arithmetic, dot product, projections, cross product, lines & planes in3-space.							
Unit 3	Euclidean n-space, linear transformations from R^n to R^m properties of linear transformations from R^n to R^m							
Unit 4	Real vector spaces, subspaces, linear independence Basis & dimension, row spaces, column spaces, null spaces, rank nullity.							
Unit 5	Inner product, angle & orthogonality in inner product spaces, orthogonal basis, Gram – Schmidt process, Q-R decompositions							
Unit 6	Eigen values & Eigen vectors, Diagonalization, Orthogonal Diagonalization, Algebraic & geometric multiplicity, spectral theorem for real symmetric matrices, applications to quadratic forms.							
	Text/Reference Books:							
	1. Elementary Linear Algebra with applications (Ninth edition) H. Anton, John Wiley & Sons 2005.							
	2. Advanced Engineering Mathematics (Second edition)– R.K Jain & S.R.K Iyenger, Narosa publishing house 2005.							
	3. Advanced Engineering Mathematics (Eighth Edition) - Erwin Kreyszig , John Wiley 1999.							
	4. Linear Algebra with applications (fourth edition), G. Strang, Thomson 2006.							
	Course Outcome: At the end of the course the student is expected to understand							
	• Basic concepts of linear algebra							
	• Students are strengthen in the field of linear algebra.							
	• Students are able to solve Engineering and Scientific problems							
	• Students are able to solve real life problems.							
	• Students are able to understand the generalised concepts of linear algebra and its importance.							

UEP 101 Engineering Physics-I :

	Teaching Scheme:		**Examination Scheme:**
	Lectures	4 hrs/week	Theory:(Mid Term : 30 marks, End Sem. Exam: 70 marks)
	Practical	2 hrs/week	Practical:(Mid Term Evaluation by Course Coordinator : 50 marks, End Sem. Evaluation by internal & External Examiner: 50 marks)
	Credits	5	
	Course Objectives:		
	• To Teach few Fundamental Principles in Physics and their applications in the field of Engineering		
Unit 1	Wave Nature of light : Interference: Theory of Newton's rings and applications, Michelson's interferometer &its applications		

	Diffraction: Fraunhofer's diffraction through single slit, Intensity distribution, Diffraction grating, measurement of wave length of sodium light.
	Polarization: Production and detection of plane, circular and elliptically polarized light with sufficient mathematical background. Optical microscope: Just qualitative treatment Problems.
Unit 2	Particle nature of waves: Planck's quantum theory of light, Explanation of laws of photoelectric emission in terms of quantum nature of light. Compton effect again in terms of quantum nature of waves. Electron microscope: Just qualitative treatment to compare with optical microscope.
Unit 3	Wave nature of particles: De Broglie's concept of matter waves, Davisson –Germer experiment, G.P.Thomson's experiment.
Unit 4	Quantum Mechanics: Fundamental difference between Newtonian mechanics and quantum mechanics, Uncertainty principle,Derivation of wave equation propagating along a stretched string and its solution. The wave function Ψ.Requirements that Ψ must fulfill. Schrodinger equation(time dependent and steady-state form in one and three dimensions) expectation values, operators, , Eigen values, Eigen functions. Particle in a one dimension rigid box i) energy quantization, ii) Wave function & iii) momentum quantization
Unit 5	Electromagnetism: Displacement Current, Maxwell's Equations(quantitative treatment of all the 4 equation), Source of Electromagnetic Waves, Nature(Characteristics) of Electromagnetic Waves, Electromagnetic Spectrum
Unit 6	Physics and Properties of Semiconductors-a resume: Crystal Structure, Energy Bands, Carrier Concentration at thermal equilibrium, Carrier transport phenomena, Phonon spectra and optical, thermal and High-field properties of Semiconductors, Basic Equations for Semiconductor device operation. Diode and Transistor based circuits and their characteristics
	Text Books :
	1. Perspectives of Modern Physics - by Arthur Beiser
	2. Introduction to Modern Physics - by Richtmyer - Kennard – Cooper
	3. Introduction to Solid State Physics - by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
	4. Physics of Semiconductor Devices by S.M.Sze
	5. Engineering Physics - by R. K. Gaur and S.L. Gupta, Dhanpat Rai Publications
	6. Text Book of Engineering Physics - by Kshirgar and Avadhanlu
	Reference Books:
	1. Perspectives of Modern Physics-by Arthur Beiser
	2. Introduction to Modern Physics-by Richtmyer-Kennard-Cooper
	3. Optics-by Zenkins and White
	4. Optics-by Brijlal and Subramanyam
	5. Physics II-by Halliday and Resnik
	6. Physics of Semiconductor Devices by S.M.Sze
	Course Outcomes: At the end of the course the student is expected to understand
	• Wave phenomenon exhibited by Electromagnetic radiations
	• Working principles of optical instruments
	• Fundamentals of lasers and its Engineering applications
	• Foundation as well as comprehensive background of Quantum mechanics
	List of Physics Practicals:
	1. Measurement of radius of curvature of convex lens by using Newtons rings.
	2. Determination of wavelength of monochromatic light by using Michelson interferometer

	3. Diffraction Grating-measurement of wavelength
	4. Ultrasonic interferometer
	i) to calculate the velocity of ultrasonic sound through different liquid media
	ii) to calculate the adiabatic compressibility of the given liquid.
	5. Production and detection of PPL by polarizers, nicol prism and by reflection (Brewster's law).
	6. Production and detection of circularly and elliptically polarized light by using nicol prism and quarter wave plates.
	7. Volt-Amp characteristics of p-n junction rectifier diode in forward and reverse bias.
	8. Volt-Amp characteristics of zener diode in forward and reverse bias.
	9. Optical fiber kit experiment
	10. Input and output characteristics of p-n-p or n-p-n transistor in C.B.configuration
	11. He-Ne Laser based experiment.
	12. Demonstration of Hydrogen spectrum.

UCS 101 Introduction to Computers & Programming:

	Teaching Scheme:		**Examination Scheme:**
	Lectures	3 hrs/week	Theory:(Mid Term : 30 marks, End Sem. Exam: 70 marks)
	Practical	2 hrs/week	Practical:(Mid Term Evaluation by Course Coordinator : 50 marks, End Sem. Evaluation by internal & External Examiner: 50 marks)
	Credits	4	

Course Objectives:

- Emphasis of this course is to improve problem solving strategies, techniques and skills of engineering students. Computer and its programming language are essential tools to solve problems efficiently. During this course student will learn various concepts and techniques for problem solving and implement those ideas using C programming

Unit 1	Problem solving techniques. Problem solving methods, algorithm, flowchart, computer as problem solving tool.
Unit 2	Introduction to computer and programming
	Computer architecture, hardware: input/output devices, memory, processor, software, system software (operating system, compiler, interpreter, linker, device drivers), application software, memory management and file management (file extension and usage), different programming languages.
Unit 3	C language preliminaries
	Introduction to C, flavors of C, C character set, constants, symbolic constants, identifier and keywords, variables, data types, operators (arithmetic, assignment, relational, logical, bitwise, conditional, increment/decrement and special operators), expressions, operators precedence and association.
Unit 4	Programming essentials
	Structure of C program, C compilation model, C standard library, preprocessor directives, input/output facilities (scanf(), printf(), getchar(), putchar(), gets(), puts()), program editing, compile, debugging.
Unit 5	Program flow control
	if, if-else, nested if else, else if ladder, switch case, break, continue, goto, for, while, do-while, nested loops.
Unit 6	Array and Strings. Declaration, initialization, types, processing, multidimensional array. String declaration, initialization of strings, functions in string.h(strlen(), strcpy(), strcmp(), strcat(), strrev()), array of string
Unit 7	Functions. Introduction, types, declaration, function call, function prototype, return statement, parameter passing, call by value, call by reference, recursion.

Unit 8	Structures and union. Declaration of structures, accessing members of a structure, structure as functions argument, structures and array, union
Unit 9	Pointers. Pointers and their characteristics, address and indirection operators, pointer arithmetic, passing pointer to function, pointer to array, pointer to string, dynamic memory allocation
Unit 10	File management. Introduction, file structure, file handling functions, file types.
	Text Books :
	1. G Dromey, How to solve it by computer, Prentice Hall Inc, Upper saddle river, NJ, 1982.
	2. B W Kerningham and D M Ritchie, The C programming language, Second edition, PHI, 2001
	3. R S Bichkar, Programming with C, Universities press, 2012
	4. Ashok N Kamthane, Programming in C 2/e, Pearson education, 2012.
	Reference Books:
	1. Herbert Schidt, C: The complete reference, 4th edition, McGraw Hill publication.
	2. E Balguruswamy, Programming in ANCI C, Fourth edition, Tata McGraw Hill, 2008.
	3. K R Venugopal and S R Prasad, Mastering C, Tata McGrath Hill
	4. Subhash K Shinde, Structured programming Approach, Wiley publication.
	Course Outcomes: At the end of the course the student is expected to understand
	• Problem solving techniques.
	• Overview of computer organization
	• Concepts C of programming.
	• How to develop the solution for real time problems.

UME 101 Elements of Mechanical Engineering:

	Teaching Scheme:		**Examination Scheme:**
	Lectures	2 hrs/week	Theory: (Mid Term : 30 marks, End Sem. Exam: 70 marks)
	Practical	00 hrs/week	
	Credits	2	
	Course Objectives:		
	• Imparting knowledge of thermodynamics concepts & their significance		
	• Providing knowledge about various mechanical devices		
	• Making the students conversant with various sources of energy.		
	• Making the students understand the basic design procedure of a engineering component		
	• Providing foundation concepts of different manufacturing processes		
	• Creating interest among students of all engineering disciplines about Mechanical Engineering Systems		
	Course Content:		
Unit 1	Thermodynamic Concepts:		
	Introduction to thermodynamics, introduction to various thermodynamic properties (e.g. pressure, temperature, enthalpy, energy, entropy), Heat and Work, P-dv work in various processes, thermodynamic laws and their significance, significance of Entropy.		

Unit 2	Energy conversion devices:
	Power producing devices - concept of heat engine, I.C. Engine and its classification (working of four stroke engine), turbine and its types (working of a water turbine). Power consuming devices – concept of heat pump, air compressor, household refrigerator, air conditioner.
Unit 3	Sources of Energy:
	Conventional- thermal, nuclear, hydraulic power plant Nonconventional- wind, solar, tidal, geothermal, attempts to save the energy.
Unit 4	Power /motion transmission devices:
	Shafts, belt drive, chain drive, gear and gear trains, single plate friction clutch.
Unit 5	Design Fundamentals:
	Design considerations, steps in design, various mechanical properties of material, selection of engineering materials.
Unit 6	Manufacturing:
	Introduction to various manufacturing techniques like machining (turning, drilling), forming (drawing, bending), assembly (welding, bolted), applications of each process.
	Reference / Text Books:
	1. R. K. Rajput "Elements of Mechanical Engineering" Firewall media 2005.
	2. Y.Cengel & M.Boles "Thermodynamics an Engineering approach" Tata McGraw Hill education 2008.
	3. R.K. Rajput "Thermal Engineering" Laxmi Publications 2010.
	4. P.K. Nag "Engineering Thermodynamics" Tata McGraw Hill education 2008.
	5. V. B. Bhandari "Design of Machine Elements" Tata McGraw-Hill education 2010.
	6. S. K. & A.K. Hajra Choudhary "Elements of workshop technology vol I & vol II" Media promoters &publishers pvt ltd 2007.

UPR 102 Engineering Drawing

	Teaching Scheme:		**Examination Scheme:**
	Lectures	2 hrs/week	Theory:(Mid Term : 30 marks, End Sem. Exam: 70 marks)
	Practical	4 hrs/week	Practical:(Mid Term Evaluation by Course Coordinator : 50 marks, End Sem. Evaluation by internal & External Examiner: 50 marks)
	Credits	2	

	Course Objectives:
	• To introduce students to the conventions, concepts and basic principles of Engineering Drawing.
	• To enable students to draw projections of geometrical objects and real life components.
Unit 1	Introduction to Engineering Drawing:
	Introduction, use of various drawing instruments, lettering, layout of drawing sheet ,sizes of the drawing sheets, different types of lines used in the drawing practice, dimensioning – linear, angular, aligned system, unidirectional system , parallel dimensioning, chain dimensioning , location dimension and size dimension.
Unit 2	Projections of Points and Lines:
	Projections of points in all possible position w.r.t. reference planes, projections of lines when it is perpendicular to one of the reference planes, when line is inclined to one and parallel to other reference plane, line inclined to both reference planes, applications of projection of lines and concept of traces of lines.
Unit 3	Projections of Planes and Solid:
	Projection of planes when it is parallel to one of the reference planes, lying in reference plane, when it is perpendicular to one and inclined to other reference plane, when it is inclined to both reference planes,

	projection of auxiliary planes. Projection of solid when axis is perpendicular to one of the reference planes, when axis is inclined to one and parallel to other reference plane, when axis is inclined to both the reference planes, projection of cube, right regular prisms, right regular pyramids, right circular cylinder, right circular cone, tetrahedron, frustum of solids		
Unit 4	Orthographic Projections:		
	Multi view orthographic projections for parts/patterns with isometric /non-isometric surfaces and circular features and sectional views. Reading of orthographic projections and missing lines/views.		
Unit 5	Isometric Projections		
	Definition of isometric view, projection, isometric scale, non isometric lines, circular features in context of isometric projection. Construction of isometric view/projection from given orthographic views.		
Unit 6	Loci of points:		
	Four bar mechanism, Single slider crank mechanism and allied mechanisms.		
Unit 7	Development of surfaces:		
	The development of lateral surfaces of prism, pyramid, cone, cylinder transition pieces etc. and parts thereof.		
	Term Work:		
	Sheet No. 01	Projection of Lines	Minimum four problems
	Sheet No. 02	Projection of Planes/Solids	Minimum four problems
	Sheet No. 03	Orthographic Views	Minimum four problems
	Sheet No. 04	Isometric Views/Projection	Minimum four problems
	Sheet No. 05	Development of surfaces/ Loci of Points	Minimum four problems
	Assignments based on the above syllabus in the sketch book.		
	Text Books :		
	1. N. D. Bhatt and V. M. Panchal, Elementary Engineering Drawing, 49th edition, Charotar Publisher, 2011		
	2. N. D. Bhatt and V. M. Panchal, Machine Drawing, 43rdedition, Charotar Publisher, 2001		
	3. M. B. Shah and B. C. Rana, Engineering Drawing Pearson Education, 2005		
	4. DhananjayJolhe, Engineering Drawing, TMH, New Delhi, 2008.		
	5. Basant Agrawal and C.M. Agrawal, Engineering Drawing, Tata Mcgraw-hill Publishing Co. Ld., New Delhi, India.		
	6. K. L. Narayana and P. L. Kannaiah, "Text Book on Engineering Drawing", Second edition, Scitech Publications (India) PVT. Ltd. Chennai, 2011.		
	7. Amar Pathak and Kogent learning solution Inc, "Engineering Drawing,2010, published by Dreamtech press, New Delhi.		
	8. Amar Pathak and Kogent learning solution Inc, "Engineering Drawing, 2012, published by Dreamtech press, New Delhi.		
	9. K. C. John, "Engineering Graphics for Degree", PHI Learning Pvt. Ltd., New Delhi, 2009.		
	10. P.J.Shah , Engineering Graphics, S. Chand publication edition, 2011-12, New Delhi.		
	11. M.B.Shah, B.C. Rana, "Engineering Drawing" Second edition 2009, published by Pearson Education India.		
	Reference Books:		
	1. W. J. Luzadder, Fundamentals of Engineering Drawing, Prentice Hall of India.		
	Course Outcomes: At the end of the course the student is expected to understand		
	• Students are able to draw projections of point, line, plane and solid using the fundamental principles		
	• Students are able to draw development of lateral surfaces		
	• Students are able to read/interpret the engineering drawing and draw orthographic and isometric views		

UWS 101: Workshop Practices

	Teaching Scheme:		**Examination Scheme:**
	Practical	2 hrs/week	Term Work- 50 Marks
	Credits	1	
	Course Objectives:		
	• To Acquaint the students with basic operations like fitting, carpentry, plumbing and joining through practical		
	Carpentry- 1Job:		
	Introduction to wood working, kind of woods, machines, power tools, use of hand tools like hacksaws, jackplanes, chisels and gauges for construction of various joints		
	Teamwork:		
	Includes one job involving a carpentry joint		
	Fitting -1 Job		
	Introduction of fitting tools for marking, centre punching, chipping, cutting, drilling, tapping and fitting. **Term work:** Includes a job on fitting.		
	Joining methods- 1 Job Introduction of metal joining processes, introduction to welding/brazing/riveting and the tools used. **Term work:** Includes joining of two plates by lap welding/butt welding/brazing.		
	Plumbing-1Job Introduction to plumbing .tools used, types of pipe joint, pipe fittings, threading dies, **Term work:** Includes job involving joining of two pipes as per standard practice.		
	Demonstration:		
	Conventional Lathe, CNC machining centre(Turning/Milling)		
	Black smithy/forging and tin smithy operations		
	Video demonstration of industrial safety practices.		
	Video demonstration of produindustrial safety practices.		
	Text Books:		
	1. Elements of Workshop Technology- C Hazara Choudhary, Volume I and II, Media promoters and publishers, Mumbai.		
	2. Introduction to Basic Manufacturing processes and Workshop Technology- Rajendra Singh, New age International publishers 2006.		
	3. Engineering Laboratory Practices-P.Kannaiah and K.L.Narayana, SciTech publications Chennai 2006.		
	4. Workshop Technology-Volume I and II, Raghuwanshi B.S, Dhanpat Rai& Co. (P) Ltd. New Delhi 2008		
	Course Outcomes: At the end of the course the student is expected to understand		
	• Student acquires basic knowledge of workshop operations		
	• Students are able to perform fitting, carpentry, joining and plumbing operations through the acquired skill sets.		
	• Students are acquainted with industrial safety measures		

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UMA 102 Engineering Mathematics – II (Calculus)

	Teaching Scheme:			**Examination Scheme:**				
	Lectures	4 hrs/week		Theory: Mid Term : 30 marks, End Sem. Exam: 70 marks)				
	Tutorial	1 hr/week						
	Credits	5						
	Course Objectives:							
	• To introduce fundamental concepts of calculus and their applications in engineering field.							
	• To teach methods and theorems and enable them to solve engineering and scientific problems.							
	• This course of mathematics will meet the requirements and the expectations of the engineering students.							
Unit 1	Review of limits, continuity, differentiability.							
Unit 2	Mean Value Theorem, Taylors theorem, Maxima & Minima.							
Unit 3	Riemann Integrals, Fundamental theorem of calculus, Improper integrals, Application to Area & Volume.							
Unit 4	Convergence of sequence & series, Power series.							
Unit 5	Partial derivatives, Gradient & directional derivative, chain rule, Maxima & Minima.							
Unit 6	Double & triple Integrals, Jacobians & Change of variables formula							
Unit 7	Divergence & curl, theorems of Green, Gauss, & Stokes`s.							
	Text/Reference Books:							
	1. Calculus –James Stewart,(fifth edition),Thomson 2003							
	2. Calculus-GBThomas & Finney(Ninth Edition) 2007.							
	3. Advanced Engineering Mathematics – R.K Jain & S.R.K Iyenger, Narosa Publishing house.							
	4. Advanced Engineering Mathematics (Eighth Edition) - Erwin Kreyszig , John Wiley 1999.							
	5. Function Of several Variables –A.J.Tromba, J.E. Marsden and Alan Weinstein, Springer							
	Course Outcome: At the end of the course the student is expected to understand							
	• Basic concepts of calculus and its importance in engineering and technology.							
	• Students are empowered to solve engineering and scientific problems.							
	• Students are able to solve real life problems.							

UAS 102 Engineering Chemistry

	Teaching Scheme:			**Examination Scheme:**
	Lectures	4 hrs/week		Theory: Mid Term : 30 marks, End Sem. Exam: 70 marks
	Tutorial	0		
	Practical	2 hr/week		
	Credits	5		
	Course Objectives:			
	• To impart basic Chemistry of Engineering materials to the upcoming engineers			
Unit1	**Analytical Aspects of Water:** Impurities and their effects, Chemical analysis- Hardness [EDTA method], Chlorine content, Alkalinity- Numerical, Softening Methods – Lime Soda, Zeolites & ion Exchange, Desalination, troubles in boiler & their prevention.			
Unit 2	**Fuels & Lubricants:** Classification of Fuels, Calorific values-Types Units, Determination using Bomb calorimeter & Boy's calorimeter, Dulong's formula & numericals, Analysis of coal and significance numericals, Refining of petroleum, Knocking, Octane number, Cetane number , Power alcohol, biodiesel , disol, gasol.			
	Types of Lubricants, mechanism of lubricants, properties & their significance- Viscosity, V.I., Flash & Fire point, Cloud & pour point, aniline point, acid value, saponification value, selection of lubricant.			

Unit 3	**Polymer & its composites:** Polymer & types of polymerisation, Types of plastic – Thermoplastic (PVC, PE) Thermo-settings (UF) & their applications, natural rubber, vulcanization, and applications, Biodegradable & photodegradable polymers, conducting polymer, composites their classification & types.
Unit 5	**Engineering materials & Green Chemistry:** Glasses, Alloys & Abrasives. Green chemistry, basic principle, component of green chemistry, significance with suitable example.
	Text/Reference Books:
	1. Engineering Chemistry by P.C. Jain and M. Jain 15thEdition 2006, Dhanpat Rai and sons.
	2. Engineering Chemistry by S.S. Dara & S. S. Umare, S. Chand and Company Ltd., 12th Edition 2012.
	3. Fundamentals of Engineering Chemistry by S.K. Sing. New Age International Publishes.
	4. A Text Book of Engineering Chemistry by Shashi Chawla, 1st edition 2002,Dhanpat Rai & co.
	Team Work / Practical Assignment:
	1. Determination of total hardness of water.
	2. Determination of PH using PH-meter
	3. Proximate analysis of Coal. (ash determination).
	4. Estimation of Chloride content in water.
	5. Determination of dissolved Oxygen in water
	6. Determination of alkalinity in water.
	7. Preparation of Urea – formaldehyde resin.
	8. To determine coefficient of Viscosity of given solvent by Ostwald's Viscometer
	9. Determination of Acid value of lubricating Oil.
	10. Determination of Chlorine in water.
	11. Determination of Saponification value of oil.
	12. Estimation of Iron in given Iron alloy sample.
	13. Determination of aniline point of lubricant ting oil
	Course Outcomes: At the end of the course the student is expected to understand
	• Enabling students to know about relevant Engineering materials
	• Their chemistry, recent technologies, their practical applications. • To benefit outer-world with their knowledge of theoretical principles and industrial applications

UEE-101 Elements of Electrical Engineering:

	Teaching Scheme:			**Examination Scheme:**
	Lectures	4 hrs/week		Theory (Mid Term : 30 marks, End Sem. Exam: 70 marks)
	Practical	2 hr/week		Practical:(Mid Term Evaluation by Course Coordinator : 50 marks, End Sem. Evaluation by internal & External Examiner: 50 marks)
	Credits	5		

	Course Objectives:
	• To introduce basic concepts of various energy sources with their classification
	• To teach methods and theorems used in solving complicated electrical circuits
	• To teach methods and theorems used in solving complicated electrical circuits
Unit 1	**Elementary Concept :**
	Concepts of e.m.f, potential difference & current, battery. Energy Sources: Ideal and practical voltage and current sources, independent and dependent sources.

Unit 2	**DC Circuits :**
	Ohm's law, Kirchhoff's laws, simplification of networks using series - parallel combinations and star - delta transformations, Current and Voltage division rule, Mesh Analysis, Nodal Analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum power transfer theorem.
Unit 3	**Electromagnetism:**
	Magnetic effect of electric current, cross and dot conventions, right hand thumb rule,basic definitions of magnetic circuits, comparison of electrical and magnetic circuit, force on current carrying conductors placed in magnetic field, Fleming's left hand rule. B-H curve .Faraday's laws of electromagnetic induction, Fleming's right hand rule, statically and dynamically induced e.m.f., self and mutual inductance, coefficient of coupling, energy stored in magnetic field.
Unit 4	**AC Fundamentals:**
	Sinusoidal voltages and currents, their mathematical and graphical representation, Basic definitions of AC fundamentals. Phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors. Study of A.C. circuit consisting of pure resistance, pure capacitance, pure inductance and corresponding voltage- current phasor diagrams, voltage-current waveforms. Single phase A.C. circuits: Study of series and parallel R-L,R-C.R-L-C circuits, concept of impedance, admittance in case of above combinations, waveform and relevant voltage - current phasor diagrams, concept of active, reactive, apparent, complex power and power factor
Unit 5	**Electrical Machines :**
	Transformer: Theory of operation, Open circuit test. Short-circuit test, Efficiency and Voltage Regulation, Auto transformers, Working principles of DC Generator (in Brief), DC Motor (with basic calculations), introduction to 3-phase induction motor, single phase induction motor, Alternators(AC Generators)
Unit 6	**Basic Electrical Measuring Instruments :** Working principle of Permanent Magnet Moving Coil (PMMC) meters, Basic voltmeter, ammeter, wattmeter, multimeter and energy meter, Tachogenrators and stroboscope.
	Text Books:
	1. B. L. Theraja and A.K. Theraja, A text book of electrical technology, Volume I and II, S. Chand and company Ltd.New Delhi, 2004.
	2. Dr. Bharti Dwivedi, Dr.Anurag Tripathi, "Fundaments of Electrical Engineering", Wiley India Publication.
	3. M.S.Naidu, S.Kamakshaiah ,"Introduction to Electrical Engineering
	4. I. J. Nagrath, D.P. Kothari, Basic Electrical Engineering"
	Reference Books:
	1. Hughes Edward, Electrical and Electronic Technology, VIII Edition, Pearson Education, New Delhi.
	2. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd Edition, Pearson Education, New Delhi
	Term Work:
	1. The term work for the subject shall consist of a report on the performance of any eight experiments (minimum)from the following:
	2. Verification of Kirchhoff's Laws
	3. Verification of Superposition Theorem.
	4. Verification of Thevenin's Theorem.
	5. Verification of Maximum Power Transfer Theorem
	6. Determination of Performance of R-L Series and R-C Series circuits for DC transients.
	7. Determination of Performance of R-L-C Series and A.C. parallel Circuit.
	8. Measurement of power in single phase circuit with R-L load and calculations of A.C. Parameters
	9. Determination of efficiency and Regulation of a single phase transformer by O.C & S.C. tests and by direct loading.

	10. Measurement of speed by tachometers and stroboscope.
	11. Determination of unknown resistance by DC Bridge.
	12. Study of different types of Resistors, Capacitors and Inductors. Components identification, and specification for I. Wires, Cables, Conductors, II. Fuses, line testers, III. Pliers of different type and IV. Wiring components like holders, switches plug tops, plug sockets, junction boxes, ceiling roses MCBs etc
	13. Testing of components and assembly of a fluorescent tube.
	14. Wiring exercises / Stair case wiring and control of two lamps by two switches
	15. Study and use of megger Insulation testier.
	16. Dismantling, assembly and fault finding of Ceiling Fans or table fan or automatic electric iron or plate tube water heater (Megger testing included)
	17. Earthling of Electrical Installation: Requirements, procedure and testing

UCW 102 Engineering Mechanics

	Teaching Scheme:			**Examination Scheme:**
	Lectures	3 hrs/week		Theory (Mid Term : 30 marks, End Sem. Exam: 70 marks)
	Tutorial	2 hr/week		Practical:(Mid Term Evaluation by Course Coordinator : 50 marks, End Sem. Evaluation by internal & External Examiner: 50 marks)
	Practical	2 hrs./week		
	Credits	5		

	Course Objectives:
	• To develop the ability to independently apply mathematics and basic engineering science in the field of engineering mechanics.
	• To develop the ability to learn and apply first principles of science in the field of engineering mechanics.
	• To develop ability to be creative and critical in order to formulate and investigate problems in mechanical systems.
	PEO-I **: Core Competence**: Graduates shall be equipped with fundamentals of engineering sciences, humanities, civil engineering concepts, analysis and design methodologies and management skills.
	PEO-II**: Engineering Skill development**: Students shall be able to apply knowledge, logical reasoning, and quantitative skills to design and implement creative and sustainable solutions in civil and water management engineering.
Unit 1	**Fundamentals of Statics:** Definition of force, Force system, Classification of force systems, Law of parallelogram of forces, Triangle law of forces, polygon of forces, Lami's Theorem, Principle of transmissibility, Principle of superposition, Resolution of a force, Varignon's theorem, Couple, Equivalent force system, Vectors – Vectorial representation of forces and moments, Vector operations, Free body diagram, Equilibrium of coplaner, collinear and concurrent force systems, Parallel and non parallel force systems, Conditions of equilibrium.
Unit 2	**Analysis of Trusses and Frames:** Defining perfect and imperfect frames, Assumptions and approximations in analyzing frames, Method of joints, Method of sections and graphical applications.
Unit 3	**Centre of Gravity and Moment of Inertia:** Concept of center of gravity and centroid, Determination of centroid for regular geometrical figures and lines, Determination of Centroid for composite figures, Definition of moment of inertia, Radius of gyration, Theorem of perpendicular and parallel axis, Determination of moment of inertia for regular geometrical figures, Determination of moment of inertia of composite figures.
Unit 4	**Friction:** Definition of friction, Types of friction, Laws of friction, Angle of repose, Cone of friction, Analysis of rigid bodies and Connected rigid bodies on rough inclined surfaces, Analysis of ladder friction and wedge friction, Introduction to kinetic friction, Open flat belt drive, Cross belt drive, Compound belt drive, Power transmitted by belt drive and rope drive.
Unit 5	**Beams:** Types of beams, Types of supports, Types of loading, Support reactions, Shear force and bending moment diagrams for simple beams

Unit7	**Work, Power and Energy:** Introduction to work, power and efficiency, Kinetic energy and potential energy, Work energy principle applied to particle and connected rigid bodies, Law of conservation of energy.
Unit 8	**Impulse and Momentum:** Linear Impulse–Momentum relation applied to particle, Principle of linear impulse momentum applied to connected rigid bodies, Conservation of linear momentum.
	Term Work: [02 Hrs/Week]
	Term Work Shall consists of a record of Laboratory/Practical work as listed below
	Graphical Solutions:
	• System of non concurrent forces.
	• Problem on Wedge and Block Friction.
	• Problem on connected bodies on an incline.
	• Analysis of frames two problems
	Experiments:
	1. Moment of Inertia of Flywheel
	2. Belt Friction
	3. Member Forces in Trusses
	4. Study of any two Simple Machines
	Assignments:
	Analytical solutions for at least two problems on each of the chapters to be regularly solved in the practicals.
	Reference Books:
	1. Engineering Mechanics Statics and Dynamics, A.Nelson, Tata McGraw Hill Pub. Ltd., New Delhi.
	2. Engineering Mechanics, Ferdinand L Singer, Harper and Rowe Publications.(Statics and Dynamics)
	3. Mechanics for Engineers Beer and Johnson, McGraw Hill Publications(Statics and Dynamics)
	Course Outcome: At the end of the course the student is expected to understand
	• Gain insight into fundamentals of engineering sciences and civil engineering, water management and environmental engineering concepts.
	• Grasping the theory, methods and materials for engineering analysis, result interpretation and design.
	• Comprehension of tools, techniques and issues associated with civil and water management engineering applications.

UCW 101 Environmental Studies (Audit)

	Teaching Scheme:			**Examination Scheme:**
	Lectures	3 hrs/week		Theory (Mid Term : 30 marks, End Sem. Exam: 70 marks)
	Tutorial	NA		
	Practical	NA		
	Credits	0		

	Course Objectives:
	• **The 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
	• **Forest resource:** Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests 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, case studies.
	• **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture fertilizer-pesticide problems, water logging, salinity, case studies.
	• **Energy resources:** Growing energy needs, renewable & non renewable energy resources, use of alternate energy sources, case studies
	• **Land resources:** Land as resources, land degradation, man induced landslides, soil erosion and desertification
	• **Role of an individual in conservation of natural resources**, equitable use of resources for sustainable life- styles.
	• **Ecosystems:** Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decompos- ers, Energy flow in the ecosystem, Ecological succession Food chains, food webs and ecological pyramids Introduc- tion, types, characteristic features, structure and function of the following ecosystem: Forest ecosystems, Grassland ecosystem, Desert ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
	• **Biodiversity and its conservation:** Introduction – Definition: genetic, species and ecosystems diversity Bio- geographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels, India as a mega-diversity nation Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts Endangered and endemicspecies of India Conservation of biodiversity: In –situ and Ex-situ conservation of biodiversity.
	• **Environmental pollution:** Definition; Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Pollution case studies.
	• **Disaster management:** floods, earthquake, cyclone and landslides. • **Social Issues and Environment:** From unsustainable to sustainable development, urban problems related to energy, Water conservation, rain water harvesting, and watershed management
	• **Resettlement and rehabilitation of people:** its problems and concerns. Case studies • **Environmental ethics:** issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies, Wastel- and reclamation, Consumerism and waste products. **Environment protection Acts:** Air (Prevention and of pollution) Act Water (prevention and control of pollution) Act, Wildlife protection Act, Forest Conservation Act, Is- sues involved in enforcement of environmental legislation, Public awareness
	• **Human Population and the Environment:** Population growth, variation among nations, Population explosion Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV/AIDS Wom- en and Child Welfare, Role of Information Technology in Environment and human health, Case Studies.
	• **Field Work:** Visit to a local area to document environmental assets- river/ forest/ grassland/ hill/ mountain, Visit to a local polluted site- Urban/ Rural/Industrial/Agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc.
Reference Books:	
	1. Environmental Science by John, Tata McGraw Hill publications, New Delhi.
	2. Environmental engineering and Management by S K Dhameja, S K Kataria and sons, New Delhi

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