

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Bachelor of Technology
Department of Civil Engineering

I B. Tech. – I Semester (CE)

S.No.	Course Code	Subject	L	T	P/Drg	C
1.	16HS601	Functional English	3	-	-	3
2.	16HS602	Engineering Mathematics – I	3	1	-	3
3.	16HS603	Engineering Physics	3	1	-	3
4.	16CS501	Computer Programming	3	1	-	3
5.	16HS606	Human Values & Professional Ethics	3	-	-	3
6.	16HS608	Engineering Physics Lab	-	-	4	2
7.	16CS502	Computer Programming Lab	-	-	4	2
8.	16ME301	Engineering & IT Workshop Lab	-	-	4	2
Contact Periods / Week			15	3	12	21
			Total/Week 30			

I B. Tech. – II Semester (CE)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS610	Professional English	3	-	-	3
2.	16HS611	Engineering Mathematics – II	3	1	-	3
3.	16HS604	Engineering Chemistry	3	1	-	3
4.	16ME302	Engineering Graphics	-	-	6	3
5.	16CE101	Engineering Mechanics	3	1	-	3
6.	16HS607	English Language and Communication Skills Lab	-	-	4	2
7.	16HS609	Engineering Chemistry Lab	-	-	4	2
8.	16CE102	Applied Mechanics Lab	-	-	4	2
Contact Periods / Week			12	3	18	21
			Total/Week 33			

II B. Tech. – I Semester (CE)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS612	Engineering Mathematics – III	3	1	-	3
2.	16EE209	Electrical & Mechanical Technology	3	1	-	3
3.	16CE103	Strength of Materials – I	3	1	-	3
4.	16CE105	Surveying	3	1	-	3
5.	16CE106	Fluid Mechanics	3	1	-	3
6.	16CE107	Building Materials & Construction	3	1	-	3
7.	16CE108	Surveying Lab – I	-	-	4	2
8.	16CE109	Strength of Materials Lab	-	-	4	2
Credit Course						
9.	COE-I	Comprehensive Online Examination-I	-	-	-	1
Audit Course						
10.	16CS503	Data Structures through C	3	-	-	-
Contact Periods / Week			21	6	8	23
			Total/Week		35	

II B. Tech. – II Semester (CE)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS613	Probability & Statistics	3	1	-	3
2.	16HS605	Environmental Studies	3	1	-	3
3.	16CE110	Building Planning & Drawing	3	1	-	3
4.	16CE111	Strength of Materials – II	3	1	-	3
5.	16CE113	Hydraulics & Hydraulic Machinery	3	1	-	3
6.	16CE114	Surveying Lab – II	-	-	4	2
7.	16CE115	Computer Aided Drawing Lab	-	-	4	2
8.	16CE116	Fluid Mechanics & Hydraulic Machinery Lab	-	-	4	2
Credit Course						
9.	COE-II	Comprehensive Online Examination-II	-	-	-	1
Audit Course						
10.	16HS614	Comprehensive Soft Skills	3	-	-	-
Contact Periods / Week			15	5	16	22
			Total/Week		36	

***L-Lecture hours, T-Tutorial, P-Practical, Drg: Drawing, C-Credit**

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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I B. Tech. – I Sem. (CE)

L	T	C
3	0	3

**(16HS601) FUNCTIONAL ENGLISH
(Common to All Branches)**

Course Objectives:

- To develop communication skills among the students.
- To construct proficiency in academic and social purpose to improve their grammatical accuracy.
- To understand LSRW skills and inculcate the habit of reading for pleasure.
- To obtain study skills and communication skills in formal and informal situations.
- To use appropriate vocabulary

Course Outcomes:

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.

UNIT I

MINDSCAPES (Environmental Consciousness: Pollution - How To Regain Green Cover):

1. Learning English Language through Literature (Secret of work- Swami Vivekananda)
2. Present, Past and Future aspects
3. Introducing oneself

Grammar: Parts of speech-Kinds of sentences-Tenses

Vocabulary: Synonyms & Antonyms-Affixes – Phrasal verbs

Listening & Reading Activities

Writing: Paragraph writing-Note taking & Note making

Phonetics- Syllabification

UNIT II

MINDSCAPES (Emerging Technologies: Solar Thermal Power- Nano Technology):

1. Learning English Language through Literature (Stopping by Woods on a Snowy Evening- Robert Frost)
2. Set in the Past
3. Inter-personal skills Grammar – Articles – Past Events – Voice & Impersonal passive

voice – Gerund & -ing forms
 to-infinitives
 Vocabulary: Phrases – Idioms – word roots
 Listening & Reading Activities
 Writing: Letter writing- Informal- Formal
 Phonetics – Accent

UNIT III

MINDSCAPES (Global Issues: Child Labor- E- Waste):

1. Learning English Language through Literature (What is my Name?- P.Satyavathi)
2. Describing a person, place and object
3. Possibilities
 - Grammar: Modals – Conditionals – Framing Questions – Compound nouns
Verbs
 - Vocabulary: One word substitute– Fixed expressions– Clauses
 - Listening & Reading Activities
 - Writing: Information transfer
 - Intonation: Falling & Rising

UNIT IV

MINDSCAPES (Space Trek: Hubble Telescope- Genesis of ISRO):

1. Learning English Language through Literature (Man in Black-Oliver Goldsmith)
2. Analytical thinking
3. Co-operative learning
 - Grammar: Concord–Reported speech-compare & contrast
 - Vocabulary: Numerical expressions-definitions-collocations
 - Listening & Reading
 - Writing: Summary-Essay writing-Making instructions
 - JAM

UNIT V

MINDSCAPES (Media Matters: History Of Media- Power of Media- Interviews):

1. Learning English Language through Literature (The Power of Prayer-Abdul Kalam)
2. Exploring creative ideas
3. Synthesis of sentences
 - Grammar: Simple, compound and complex-Spotting errors
 - Vocabulary: Discourse markers-Homonyms-Homophones-Homographs
 - Listening & Reading Activities
 - Writing: Writing recommendations-scrambled sentences
 - Convincing others

TEXT BOOKS:

1. *Mindscapes: English for Technologists and Engineers-* Orient Black Swan, 2014.
2. *Paths to Progress in English: Orient Black Swan*

REFERENCES:

1. *Raymond Murphy's Intermediate English Grammar with CD*, Raymond Murphy, Cambridge University Press, 2012.
2. *Communication Skills*, Sanjay Kumar & Pushpalatha, Oxford University Press, 2012.
3. *Writing Tutor. Advanced English Learners' Dictionary*, 9th Edition, Oxford University Press, 2015.
4. *Powerful Vocabulary Builder*, Anjana Agarwal, New Age International Publishers, 2011.
5. *Keep Talking*, F. Klippel, Cambridge University Press, 2013.
6. *Listening Extra*, Miles Craven, Cambridge University Press, 2008.
7. *Reading Extra*, Liz Driscoll, Cambridge University Press, 2004.
8. *Writing Extra*, Graham Palmer, Cambridge University Press, 2004.
9. *Speak Well*, Jayashree Mohanraj et al, Orient Blackswan, 2013.



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**(16HS602) ENGINEERING MATHEMATICS-I
(Common to all Branches)**

Course Objectives:

- To train the students thoroughly in Mathematical concepts of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- To prepare students for lifelong learning and successful careers using mathematical concepts of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- To develop the skill pertinent to the practice of the mathematical concepts including the student abilities to formulate and modeling the problems, to think creatively and to synthesize information

Course Outcomes:

- The students become familiar with the application of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

UNIT I

DIFFERENTIAL EQUATIONS: Exact and Non-exact (Integrating factors), Linear and Bernoulli differential equations, Applications to first order equations: Orthogonal Trajectories, Newton's Law of Cooling, Natural Law of Growth and Decay. Linear Differential Equations of second and higher order with constant coefficients. Method of variation of parameters. Applications of linear differential equations- Simple electric circuits.

UNIT II

Taylor's and Maclaurin's Series, Functions of several variables, Jacobian, Maxima and Minima of functions of two variables, Lagrange's method of undetermined Multipliers with three variables only. Radius of curvature.

UNIT III

MULTIPLE INTEGRALS: Evaluation of Double and Triple integrals, Change of order of integration, Change of variables. Simple applications to areas.

UNIT IV

LAPLACE TRANSFORM I:Laplace transforms of standard functions, First shifting Theorem, Transforms of derivatives and integrals, Unit step function, Second shifting theorem, Laplace transforms of Periodic functions.

UNIT V

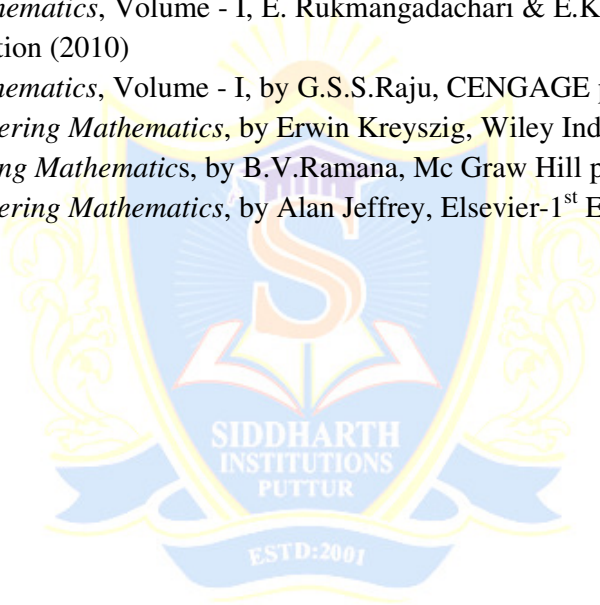
LAPLACE TRANSFORM II: Inverse Laplace Transforms, Convolution theorem, Application of Laplace transforms to ordinary differential equations of first and second order.

TEXT BOOKS:

1. *Higher Engineering Mathematics*, B.S.Grewal, Khanna publishers-42nd Edition (2012).
2. *Engineering Mathematics* Volume-I, by T.K.V. Iyengar, S.Chand publication-12th Edition.

REFERENCES:

1. *Engineering Mathematics*, Volume - I, E. Rukmangadachari & E.Keshava Reddy, Pearson Publisher 1st Edition (2010)
2. *Engineering Mathematics*, Volume - I, by G.S.S.Raju, CENGAGE publisher (2013).
3. *Advanced Engineering Mathematics*, by Erwin Kreyszig, Wiley India-10th Edition (2012).
4. *Higher Engineering Mathematics*, by B.V.Ramana, Mc Graw Hill publishers (2008).
5. *Advanced Engineering Mathematics*, by Alan Jeffrey, Elsevier-1st Edition (2001).



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**(16HS603) ENGINEERING PHYSICS
(Common to CE, EEE & ME)**

Course Objectives:

- To evoke interest on applications of superposition effects like interference & diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric wave guides along with engineering applications.
- To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays & non-destructive evaluation using ultrasonic techniques.
- To get an insight into the microscopic meaning of conductivity, classical & quantum free electron model & evaluation of band theory to distinguish materials & to understand electron transport mechanism in solids.
- To open new avenues of knowledge & understanding semiconductor based electronic devices, basic concepts and applications of semiconductors & magnetic materials have been introduced which find potential in the emerging micro device applications.
- To give an impetus on the subtle mechanism of superconductors in terms of conduction of electron pairs using BCS theory, different properties exhibited by them & their fascinating applications. Considering the significance of microminiaturization of electronic devices & significance of low dimensional materials, the basic concepts of nanomaterials, their synthesis, properties & applications in emerging technologies are elicited.

Course Outcomes:

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long range order and periodicity, structure determination using X-ray diffraction are focused with defects in crystals & ultrasonic non destructive techniques.
- The discrepancies between the classical estimates & laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting & magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

UNIT I

PHYSICAL OPTICS, LASERS AND FIBRE OPTICS: Physical Optics: Interference - Introduction - Interference in thin films by reflection – Newton's Rings. Diffraction - Introduction- Fraunhofer diffraction due to single slit and diffraction grating.

LASERS: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation --Einstein's relation, Population inversion – Excitation mechanism & optical resonator – ND: YAG laser - He-Ne laser, semiconductor diode laser -Applications of lasers.

FIBRE OPTICS: Introduction– Construction and working principle of optical fiber – Numerical aperture and acceptance angle – Types of optical fibers – Attenuation and losses in fibers -Optical fiber communication system – Applications of optical fibers in communications, sensors and medicine.

UNIT II

CRYSTALLOGRAPHY, ACOUSTICS AND ULTRASONICS: Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravais lattice –Crystal systems – Packing fractions of SC, BCC and FCC-Directions and planes in crystals – Miller indices – Inter planar spacing in cubic crystals – X-ray diffraction - Bragg's law.

Acoustics Intensity – Absorption coefficient and its determination –Reverberation – Reverberation time (qualitative treatment) – Factors affecting acoustics of buildings and their remedies. Ultrasonics Introduction – Production of ultrasonics by piezoelectric method – Properties and detection – Applications in non-destructive testing.

UNIT III

QUANTUM MECHANICS AND FREE ELECTRON THEORY: Quantum Mechanics: Introduction to matter waves – de'Broglie hypothesis - Heisenberg's uncertainty principle and its applications - Schrödinger's time independent and time dependent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well .

Free Electron theory: Classical free electron theory - Equation for electrical conductivity - Quantum free electron theory - Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

UNIT IV

SEMICONDUCTORS AND MAGNETIC MATERIALS: Semiconductor Physics: Introduction – Intrinsic and extrinsic semiconductors (qualitative treatment), Drift & diffusion currents - Einstein's relation– Hall effect Direct & indirect band gap semiconductors. Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magneton – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis - Soft and hard magnetic materials and applications.

UNIT V

SUPERCONDUCTIVITY AND PHYSICS OF NANOMATERIALS: Superconductivity: Introduction – Meissner effect - Properties of superconductors- Type I and Type II superconductors- ac and dc Josephson effects BCS theory (qualitative) –Applications of

superconductors. Physics of Nanomaterials: Introduction - Significance of nanoscale - Surface area and quantum confinement –Synthesis of nanomaterials: ball mill, chemical vapour deposition, sol-gel, plasma arcing –applications of nano materials

TEXT BOOKS:

1. *Engineering Physics* – K.Thyagarajan, 5th Edition, MacGraw Hill Publishers, NewDelhi, 2014.
2. *Engineering Physics* - Gaur R.K. and Gupta S.L. Dhanpat Rai Publishers, 2009

REFERENCES:

1. *Engineering Physics* - Mani Naidu S.,Pearson Publications, 2011.
2. *Engineering Physics* - Arumugam K.-PHI Learning Pvt., India, 2009.
3. *Engineering Physics* -Palanisamy P.K, SCITECH Publications, 2011.
4. *Engineering Physics* -Rajagopal K. PHI, New Delhi, 2011.
5. *Engineering Physics* – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, 10th Edition,S.Chand and Company, New Delhi, 2014



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I B. Tech. – I Sem. (CE)

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**(16CS501) COMPUTER PROGRAMMING
(Common to all Branches)**

Course Objectives:

- To understand the core aspects of computer problem solving techniques
- To understand the programming language constructs
- To understand the programming paradigms

Course Outcomes:

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

UNIT I

OVERVIEW OF COMPUTERS AND PROGRAMMING: Electronic Computers Then and Now – Computer Hardware - Computer Software - Algorithms - Flowcharts - Software Development Method - Applying the Software Development Method. C Language Elements- Variable Declarations & Data Types Executable Statements – General form of a C Program- Expressions - Precedence and Associativity- Operators and Expression – Type Conversions

UNIT II

DECISION STATEMENTS: If Statement, If-else Statement, Nested- If-else Statement, Else if Ladder, Switch case – break – continue – go to Statements – Example Programs Loop Control Statements – for loop – while loop - do while – Example Programs

UNIT III

ARRAYS: Declaring and referencing Arrays – Array Subscripts, Using for loops for sequential access – Using Array elements as Function arguments – Array arguments – Multidimensional Arrays – Example Programs

STRINGS: Introduction – Declaring and Initializing String variables – Reading Strings from Terminals – Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings together – Comparison of two Strings – String Handling Functions – Table of Strings- Other Features of Strings.

UNIT IV

FUNCTIONS: Definition – Function without Arguments – Functions with input arguments – Functions with simple output parameters – Communication among Functions – Scope – Storage clauses – Type Qualifiers – Recursion

Pointers: Introduction – Understanding Pointers – Accessing the address of a variable – Declaring Pointers variables- Initialization of Pointer variables – Accessing a variable through its Pointer – Chain of Pointers – Pointer Expressions – Pointer Increment & Scale Factors – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Pointers as Function Arguments .- Function returning Pointers – Pointers to Function.

UNIT V

STRUCTURES: Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure variables – Operations on Individual members – Arrays of Structures – Arrays with in Structures – Structures with in Structures – Structures and Functions – Unions –Bit fields – TYPEDEF – ENUM

File Management in C: Introduction – Types of Files – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Error handling during IO Operations – Random access to files – Command line arguments. Preprocessor - #define and #include.

TEXT BOOKS:

1. Programming in C and Data Structures – Jeri R. Hanly, Elliot B Koffman, Ashok Kamthane, A Anand Rao – Pearson.(UNITS I, II and III)
2. Programming in C and Data Structures – E Balagurusamy - McGrawHill

REFERENCES:

1. Computer Fundamentals and C Programming - Dr. P. Chenna Reddy, ISBN: 9789351045885, Publisher: Pothi.com
2. Programming in C, Second Edition – Pradip Dey, Manas Ghosh, Oxford University Press.
3. “C from Theory to Practice”- George S. Tselikis- Nikolaos D. Tselikas- CRC Press.
4. “Programming with C”- R S Bichkar- University Press.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education. (UNIT-I)

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**(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS
(Common to CE, EEE & ME)**

Course Objectives:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

Course Outcomes:

Students undergoing this course are able to

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

UNIT I

Human Values - Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self-confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT II

Engineering Ethics - Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT III

Engineering As Social Experimentation - Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV

Safety, Responsibilities And Rights- Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk
Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V

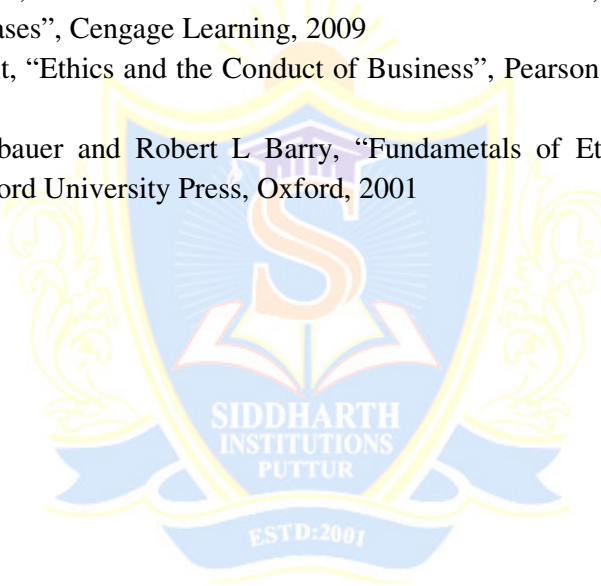
Global Issues-Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

TEXTBOOKS:

1. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Cengage Learning, 2009
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001



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I B. Tech. – I Sem. (CE)

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**(16HS608) ENGINEERING PHYSICS LABORATORY
(Common to CE, EEE & ME)**

Course Objectives:

- Will recognize the important of optical phenomenon like interference and diffraction.
- Will understand the role of optical fibre parameters and signal losses in communication.
- Will recognize the importance of energy gap in the study of conductivity and Hall- Effect in a semiconductor.
- Will understand the application of B-H curve.
- Will acquire a practical knowledge of studying the crystal structure in terms lattice constant.
- Will recognize the application of laser in finding the particle size and its role in diffraction studies.
- Will learn to synthesis of the nanomaterials and recognize its importance by knowing its nano particle size and its impact on its properties.

Course Outcomes:

- Would recognize the importance of optical phenomenon like interference and diffraction.
- Would have acquired the practical application knowledge of optical fibre, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

Any 10 of the following experiments has to be performed during the I year II Sem.

1. Determination of radius of curvature of a Plano-convex lens by forming Newton's rings.
2. Determination of wavelength of given source using diffraction grating in normal incidence method.
3. Determination of Numerical aperture, acceptance angle of an optical fiber.
4. Determination of the Energy gap of a Semiconductor diode.
5. Hall-Effect – Determination of mobility of charge carriers.
6. B-H curve – Determination of hysteresis loss for a given magnetic material.
7. Determination of Crystallite size using X-ray pattern (Powder) using Debye- Scheerer method.
8. Determination of particle size by using laser source.
9. Determination of dispersive power of a prism.
10. Determination of thickness of the thin wire using wedge Method.
11. Laser: Diffraction due to single slit.
12. Laser: Diffraction due to double slit.
13. Laser: Determination of wavelength using diffraction grating.
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Synthesis of nano material by any suitable method.

REFERENCES:

1. *Engineering Physics Practicals* – NU Age Publishing House, Hyderabad.
2. *Engineering Practical Physics* – Cengage Learning, Delhi.



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**(16CS502) COMPUTER PROGRAMMING LAB
(Common to all Branches)**

Course Objectives:

- To make the student learn C Programming language.
- To make the student solve problems, implement those using C & C++ programming languages.
- To strengthen the ability to identify and apply the suitable data structure for the given real world problem.

Course Outcomes:

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

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

LIST OF EXPERIMENTS/TASKS:

1. Practice DOS and LINUX Commands necessary for design of C Programs.
2. Practice programs: Finding the sum of three numbers, exchange of two numbers, maximum of two numbers, to read and print variable values of all data types of C language, to find the size of all data types, to understand the priority and associativity of operators using expressions, to use different library functions of C language.
3. Write a program to find the roots of a Quadratic equation.
4. Write a program to compute the factorial of a given number.
5. Write a program to check whether the number is prime or not.
6. Write a program to find the series of prime numbers in the given range.
7. Write a program to generate Fibonacci numbers in the given range.
8. Write a program to find the maximum and minimum of a set of numbers.
9. Write a program to reverse the digits of a number.
10. Write a program to find the sum of the digits of a number.
11. Write a program to find the sum of positive and negative numbers in a given set of numbers.
12. Write a program to check for number palindrome.
13. Write a program to evaluate the sum of the following series up to n terms

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots$$
14. Write a program to generate Pascal Triangle.
15. Write a program to read two matrices and print their sum and product in the matrix form.

16. Write a program to read matrix and perform the following operations.
 - i. Find the sum of Diagonal Elements of a matrix.
 - ii. Print Transpose of a matrix.
 - iii. Print sum of even and odd numbers in a given matrix.
17. Write a program to accept a line of characters and print the number of Vowels, Consonants, blank spaces, digits and special characters.
18. Write a program to insert a substring in to a given string and delete few characters from the string. Don't use library functions related to strings.
19. Write a program to split a „file“ in to two files, say file1 and file2. Read lines into the file from standard input. File1 should consist of odd numbered lines and file2 should consist of even numbered lines.
20. Write a program to merge two files.
21. Write a program to read a set of strings and sort them in alphabetical order.
22. Write a program to read two strings and perform the following operations without using Built in string Library functions and by using your own implementations of functions.
 - i. String length determination
 - ii. Concatenate them, if they are not equal
 - iii. Compare Two Strings
 - iv. String reversing
23. Write programs using recursion for finding Factorial of a number, GCD, LCM, and solving Towers of Hanoi problem.
24. Write a program to exchange two numbers using pointers.
25. Write a program to read student records into a file. Record consists of roll no, name and Marks of a student in six subjects and class. Class field is empty initially. Compute the class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.
26. A file consists of information about employee salary with fields employee id, name, Basic, HRA, DA, IT, other-deductions, Gross and Net salary. Initially only employee id, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions are user specified. Compute the Gross and Net salary of the employee and update the file.
27. Write a program to perform Base (decimal, octal, hexadecimal,...) conversions.
28. Write a program to find the square root of a number without using built-in library function.
29. Write C program to convert a string to number.
30. Write C program to generate multiplication tables from 11 to 20.

REFERENCES:

1. How to Solve it by Computer, R.G. Dromey, Pearson.
2. The C Programming Language, Brian W. Kernighan, Dennis M. Ritchie, Pearson.
3. Let us C Yeswant Kanetkar, BPB publications
4. Pointers in C, Yeswant Kanetkar, BPB publications.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education.

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**(16ME301) ENGINEERING & IT WORK SHOP LAB
(Common to CE, EEE & ME)**

Course Educational Objectives:

ENGINEERING WORKSHOP

- The course provides hands-on training in the trades of Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT WORKSHOP

- This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber-attacks are include.

Course Outcomes:

ENGINEERING WORKSHOP

After completion of this course, a successful student will be able to :

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP

After completion of this course, a successful student will be able to:

- Can install the softwares in the computers
- Utilize skills for the development of application softwares
- Can protect personal computer from virus and other cyber attacks

LIST OF EXPERIMENTS

1. TRADES FOR EXERCISES

- a. Carpentry shop:** Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, Cross lap joint, Mortise and tenon T joint, Bridle T joint from soft wood stock.

- b. Fitting shop:** Two joints (exercises) from: Square joint, V joint, Half round joint or Dove tail joint out of 100 x 50 x 5 mm M.S. stock.
- c. Sheet metal shop:** Two jobs (exercises) from: Tray, Cylinder, Hopper or Funnel from out of 22 or 20 gauge G.I. sheet.
- d. House-wiring:** Two jobs (exercises) from: Wiring for ceiling rose and two lamps (bulbs) with independent switch, two way switch, controls with or without looping, wiring for stair case lamp, wiring for water pump with single phase starter.
- e. Foundry:** Preparation of two moulds (exercises): for a single pattern and a double pattern.
- f. Welding:** Preparation of two welds (exercises): Single V butt joint, Lap joint, Double V butt joint or T fillet joint.

2. TRADES FOR DEMONSTRATION:

- a. Plumbing**
b. Machine Shop
c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

REFERENCES:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009
2. Work shop Manual, P.Kannaiah & K.L.Narayana, SciTech Publishers.
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP

LIST OF EXPERIMENTS

1. Preparing your Computer Knowledge (5 weeks)
2. **Learn about Computer:** Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.
3. **Assembling a Computer:** Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working

parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

4. Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

5. Operating system features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

6 Networking and Internet (4 weeks)

6.1 Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimping activity, logical configuration etc should be done by the student. The entire process has to be documented.

6.2 Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

7. Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc

8. Productivity tools (6 weeks)

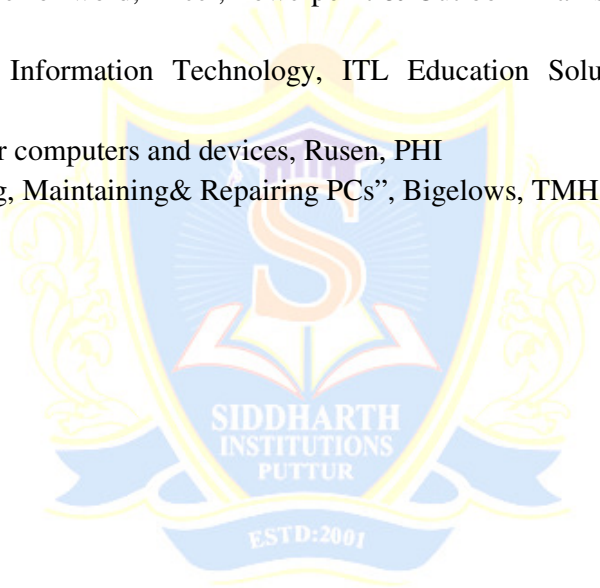
8.1 Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

8.2 Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

8.3 Presentations: Creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

REFERENCES:

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams”, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining& Repairing PCs”, Bigelows, TMH



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**

I B. Tech. – II Sem. (CE)

L	T	C
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**(16HS610) PROFESSIONAL ENGLISH
(Common to All Branches)**

Course Description: The course content focuses on LSRW skills and vocabulary building to enrich their command over language. Relevant task based activities are also carried out to enhance their communication skills.

Course Objectives:

- To develop communication skills among the students
- To construct proficiency in academic and social purpose.
- To improve their grammatical accuracy.
- To understand LSRW skills and inculcate the habit of reading for pleasure.

Course Outcomes:

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively

UNIT I

MINDSCAPES (Lessons From the past: Importance of the Past)

1. Learning English Language through Literature (*Playing the English Gentleman*
M.K.Gandhi)
2. Oral presentation
3. Effective writing
 - Grammar: Relative clauses-Adjectives
 - Vocabulary: Sequencing words
 - Listening & Reading Activities
 - Writing: Analytical paragraph writing-Minutes of meeting

UNIT II

MINDSCAPES (Energy: Renewable and Non-renewable Sources - Alternative Sources)

1. Learning English Language through Literature. (*The Portrait of a Lady* -Kushwant Singh)
2. Preparing and presenting slides, Telephone etiquette

3. Making drafts

Grammar: Adverbs - prepositions -cause and effect expressions

Vocabulary: phrasal verbs - Technical vocabulary-Extended definitions

Listening & Reading Activities

Writing: Report writing

UNIT III**MINDSCAPES (Engineering Ethics: Biotechnology - Protection from Natural Calamities)**

1. Learning English Language through Literature (*La Belle Dame Sans Mercy*-John Keats)

2. Poster presentation, Debate

3. Technical drafting

Grammar: Using connectives-Gap filling exercise using appropriate tense form

Vocabulary: Acronyms & Abbreviations

Listening & Reading Activities

Writing: Writing projects

UNIT IV**MINDSCAPES (Travel and Tourism: Atithi Devo Bhava- Tourism in India)**

1. Learning English Language through Literature (*A Marriage Proposal*-Anton Chekov)

2. Group Discussion

3. Reading comprehension

Grammar: Structure indicating purpose-Subject-verb agreement

Vocabulary: emoticons-cloze test

Listening & Reading

Writing: Intensive and extensive

UNIT V**MINDSCAPES (Getting Job Ready: SWOT Analysis- Preparing for Interviews)**

1. Learning from Literature (*Bird Sanctuary* -Sarojini Naidu)

2. Interview etiquette

3. Job application

Grammar: Spotting errors, Gap filling exercises using “gerunds” & present participle forms

Vocabulary: verbal ability

Listening & Reading Activities

Writing: Covering letter, Resume, Curriculum vitae

Convincing others

TEXT BOOKS:

1. *Mindscapes: English for Technologists and Engineers*, Orient Blackswan, 2014
2. *Paths to Progress in English*: Orient Black Swan

REFERENCES:

1. *Effective Tech Communication*, Rizvi, Tata McGraw-Hill Education, 2007.
2. *Technical Communication*, Meenakshi Raman, Oxford University Press.
3. *English Conversations Practice*, Grant Taylor, Tata Mc GrawHill publications,2013.
4. *Practical English Grammar*, Thomson and Martinet, OUP, 2010.



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I B. Tech. – II Sem. (CE)

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**(16HS611) ENGINEERING MATHEMATICS-II
(Common to all Branches)**

Course Objectives:

- To train the students thoroughly in Mathematical concepts of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations
- To prepare students for lifelong learning and successful careers using mathematical concepts of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations
- To develop the skill pertinent to the practice of the mathematical concepts including the Student abilities to formulate and modeling the problems, to think creatively and to Synthesize information

Course Outcomes:

- The students become familiar with the application of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

UNIT I

MATRICES: Rank of a matrix, Echelon form, Normal form, Consistency of system of linear equations (Homogenous and Non-homogeneous), Eigen values, Eigen vectors, Cayley Hamilton theorem (Only statement) and its applications. Quadratic forms, Diagonalization.

UNIT II

VECTOR CALCULUS: Gradient, Divergence, Curl of a vector and related properties, Line, Surface and Volume integrals, Green's, Stoke's and Gauss divergence theorems (Only statement) and its applications.

UNIT III

FOURIER SERIES: Determination of Fourier coefficients- Fourier series- Even and odd functions, Fourier Series in an arbitrary interval, Periodic function, Half range sine and cosine series, Harmonic Analysis.

UNIT IV

Fourier integral theorem (only statement), Fourier sine and cosine integrals. Fourier transform, Fourier sine and cosine transforms, properties, Inverse transforms, Finite fourier transforms.

UNIT V

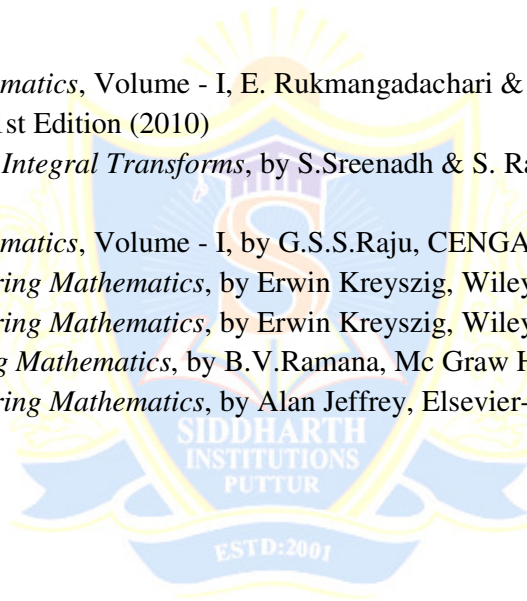
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Method of separation of variables, Solution of one dimensional wave equation, Heat equation and two dimensional Laplace equation under initial and boundary conditions.

TEXT BOOKS:

1. *Higher Engineering Mathematics*, B.S.Grewal, Khanna publishers
2. *Engineering Mathematics Volume-I*, by T.K.V. Iyengar, S.Chand publication
3. *Mathematical Methods* by T.K.V. Iyengar, S.Chand publication

REFERENCES:

1. *Engineering Mathematics*, Volume - I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher 1st Edition (2010)
2. *Fourier Series and Integral Transforms*, by S.Sreenadh & S. Ranganatham, S.Chand Publication (2014)
3. *Engineering Mathematics*, Volume - I, by G.S.S.Raju, CENGAGE publisher.(2013)
4. *Advanced Engineering Mathematics*, by Erwin Kreyszig, Wiley India-10th Edition (2012)
5. *Advanced Engineering Mathematics*, by Erwin Kreyszig, Wiley India-10th Edition (2012)
6. *Higher Engineering Mathematics*, by B.V.Ramana, Mc Graw Hill publishers (2008)
7. *Advanced Engineering Mathematics*, by Alan Jeffrey, Elsevier-1st Edition (2001)



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I B. Tech. – II Sem. (CE)

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**(16HS604) ENGINEERING CHEMISTRY
(Common to CE, EEE & ME)**

Course Objectives:

- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand the concepts of chemistry and apply to various materials for engineering applications.

Course Outcomes:

The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Understand characteristics and applications of fuels and Lubricants.

UNIT I

ELECTROCHEMISTRY, CELL & CORROSION: Electrolytes- Strong and Weak electrolytes- Definition- examples. Electrolysis - Industrial applications of electrolysis. Cell- Galvanic cell, Batteries- Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries), Fuels cells - (Hydrogen-Oxygen and Methanol-Oxygen). Corrosion- Introduction, type of corrosion (Concentration cell corrosion, Galvanic corrosion), Chemical (Dry) and Electrochemical (Wet) Theory of corrosion, Galvanic series, factors affecting the corrosion (Metal and environment) Prevention- Cathodic protection (Sacrificial anode and impressed current), electroplating (Copper, nickel and chromium) and electroless plating (Copper and nickel).

UNIT II

WATER AND ITS TREATMENT: Hardness of water and its Units, Estimation of hardness by EDTA method.

Troubles of Boilers: Scale & Sludge, Priming and Foaming, and Boiler Corrosion.

Treatment of Boiler Feed water:

Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate treatment.

External Treatment: Ion-Exchange and Permutit processes.

UNIT III

FUEL TECHNOLOGY AND LUBRICANTS: Fuel Technology- Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

Lubricants – Definition, functions of lubricants, mechanism of lubrication, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

UNIT IV

POLYMERS: Introduction- Basic concepts of polymerization, types of polymerization (Chain Growth – Addition, step growth (Condensation), Mechanism: Cationic, anionic, free radical and coordination covalent.

Plastomers – Thermosetting and thermoplastics, preparation, properties and engineering applications of PVC, Teflon, Bakelite and nylons.

Elastomers – Natural rubber, processing of natural rubbers, compounding of rubber.

Synthetic rubber- Preparation, properties and engineering applications of Buna-S, Buna-N, polyurethane, polysulfide (Thiokol) rubbers.

Conducting polymers- mechanism, synthesis and applications of polyacetylene, polyaniline.

Inorganic polymers: Basic introduction, silicones, polyphosphazines applications.

UNIT V

ENGINEERING MATERIALS: Cement- composition of Portland cement, preparation (dry and wet process) setting and hardening of cement.

Refractories – introduction, classification, properties and applications.

Nanomaterials – Introduction-Carbon Nano Tubes, Fullerenes. Semi conductors, superconductors and quantum dots.

TEXT BOOKS:

1. *Engineering Chemistry*, First Edition, Jayaveera KN, Subba Reddy GV and Ramachandraiah C, McGraw Hill Higher Education, New Delhi, 2013.
2. *A Text Book of Engineering Chemistry*, 15th Edition, Jain and Jain, Dhanapathi Rai Publications, New Delhi, 2013.

REFERENCES:

1. *A Text book of Engineering Chemistry*, 12th Edition, SS Dhara, Uma, S. Chand Publications, New Delhi, 2010.
2. *Engineering Chemistry*, First edition, Chandra Sekhar K B, Das U N and Sujatha Mishra, SCITECH Publications India Pvt. Limited, 2010.
3. *Engineering Chemistry*, First edition, Seshamaheswaramma K and Mridula Chugh, Pearson Education, 2013.
4. *Concise Inorganic Chemistry*, 7th Edn, Lee J.D., Blackwel Science Publications Oxford, London, 2004.



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I B. Tech. – II Sem. (CE)

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**(16ME302) ENGINEERING GRAPHICS
(Common to CE, EEE & ME)**

Course Objectives:

- To familiarize the students in basic concept of conic sections, projections and developments of Objects.
- To develop the imagination and drafting skills of students.

Course Outcomes:

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in engineering drawings
- Can prepare 2D and 3D diagrams of various objects

INTRODUCTION (Not to be included for examination)

Drawing instruments and their use – Lettering - Dimensioning – Simple Geometrical constructions.

UNIT I

CONIC SECTIONS: Construction of Ellipse, Parabola, Hyperbola (General and special methods). Special Curves: Cycloids, Involutes.

UNIT II

POINTS: Projections of points

LINES: Projections of straight lines - Determination of true lengths and true inclinations – line inclined to both reference planes., traces.

UNIT III

PLANES: Projections of planes – Surface inclined to both reference planes

SOLIDS: Projections of simple solids (Prisms, pyramids, cylinder and cone) - Axis inclined to both the planes.

UNIT IV

SECTIONS: Sections of solids (prisms, pyramids, cylinder and cone) in simple vertical position by using cutting plane inclined to one reference plane and perpendicular to the other – true shape of the section.

DEVELOPMENTS: Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinder and cone.

UNIT V

ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS: Principles of Isometric projection- Isometric Scale- Isometric Views- Conversion of Isometric to orthographic views– Isometric projection of simple solids (Cube, Cylinder and Cone)

INTERPENETRATION/INTERSECTIONS OF SOLIDS: Simple solids.

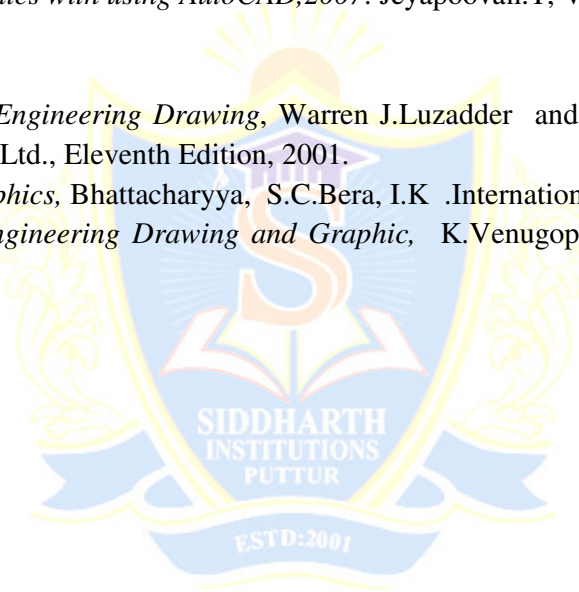
COMPUTER AIDED DRAFTING: Introduction to drafting packages - orthographic views and projections and Isometric projections (demonstration only)

TEXT BOOKS:

1. *Engineering Drawing*, N.D.Bhatt, Charotar Publishers
2. *A text Book of Engineering Drawing*, K.L.Narayana, Kanniah, Scitech Publishers, 2010
3. *Engineering Graphics with using AutoCAD,2007*. Jeyapooan.T, Vikas Publishing House

REFERENCES:

1. *Fundamentals of Engineering Drawing*, Warren J.Luzadder and Jon. M.Duff Prentice Hall of India Pvt., Ltd., Eleventh Edition, 2001.
2. *Engineering Graphics*, Bhattacharyya, S.C.Bera, I.K .International Pvt Ltd. 2009.
3. *A text Book of Engineering Drawing and Graphic*, K.Venugopal New Age Publishing New Delhi, 2008,



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I B. Tech. – II Sem. (CE)

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**(16CE101) ENGINEERING MECHANICS
(Common to CE & ME)**

Course Objectives:

- *To learn about forces and force systems and their applications.*
- *To learn about friction and to use the concept of Friction.*
- *To learn how to find centroid and Moments of Inertia of different objects using mathematical formula.*
- *To learn about rectilinear and curvilinear motions of bodies.*

Course Outcomes:

Students undergoing this course are able to

- *Construct free body diagrams and develop appropriate equilibrium equations.*
- *Understand the concepts of friction and to apply in real life problems.*
- *Determine the centroid and Moment of Inertia for composite sections.*
- *Understand the dynamic analysis of rigid body motion.*

UNIT-I

BASICS: Fundamental Principles – Resolution and Composition of Forces and Equilibrium of Particles – Principle of transmissibility – Free body diagram – Equilibrium of Rigid Body.

FORCES AND FORCE SYSTEMS: Types of force systems – Resultant of coplanar, concurrent and non-concurrent force systems – Concepts of moment – varignon's theorem.

EQUILIBRIUM OF SYSTEM OF FORCES:

Equilibrium concepts in mechanics – Free body diagram – Equilibrium of coplanar force systems – types of members and supports – support reactions.

UNIT-II

FRICTION: Types of friction– laws of Friction–Limiting friction–Cone of limiting friction–static and Dynamic Frictions – Motion of bodies – Wedge, Screw jack and differential Screw Jack-Ladder Friction.

UNIT-III

CENTROID&CENTRE OF GRAVITY: Centroids of simple figures (from basic principles) – Centroids of Composite Figures Centre of gravity of simple body -center of gravity of composites (simple Problems only).

AREA MOMENT OF INERTIA: Definition – Parallel axis and Perpendicular theorems – Polar Moment of Inertia – Radius of gyration – Moment of inertia of basic shapes, Composite Section and simple solids.

UNIT-IV

ANALYSIS OF PERFECT FRAMES: Types of frames – cantilever frames and simply supported frames – Analysis of frames using method of joints, and methods of sections for vertical loads, horizontal loads and inclined loads.

UNIT-V

KINEMATICS: Introduction to Dynamics - Rectilinear and Curvilinear motion – Displacement, Velocity and Acceleration – Motion of a Rigid Body.

KINETICS: Bodies in rectilinear translation – Curvilinear translation - D'Alembert's Principle - Principle of Work and Energy – Principle of Impulse and Momentum- (Simple Problems only).

TEXT BOOKS:

1. *A Textbook of Engineering Mechanics (As per the latest Syllabus JNTU, Anantpur)*, 3rd Edition, Bhavikatti S S, New Age International, 2016.
2. *Engineering Mechanics*, Dr. R. K. Bansal, 4th Edition, Laxmi Publications, 2011.

REFERENCES:

1. *Engineering Mechanics*, D.S. Kumar, 3rd Edition, S.K. KATARIA & SONS
2. *Singer's Engineering Mechanics: Statics and Dynamics*, 3rd Edition, K. Vijaya Kumar Reddy, J. Suresh Kumar, B.S. Publications, 2011.
3. *Engineering Mechanics: Statics*, 6th Edition, J L Meriam, L G Kraige, Wiley India Pvt. Ltd, 2001.
4. *Engineering Mechanics: Dynamics*, 6th Edition, J L Meriam, L G Kraige, Wiley India Pvt. Ltd, 2010.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**

I B. Tech. – II Sem. (CE)

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**(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
(Common to CE, EEE & ME)**

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course objectives:

- To enable students to learn better pronunciation through stress on word accent, Intonation and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence.
- To train students to use language appropriately in both formal and informal situations.
- To enhance written communication among the students.

Course outcomes:

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

UNIT I

1. Phonetics -Importance
2. Introduction to Sounds of Speech
3. Vowels and Consonant sounds
4. Phonetic Transcription

UNIT II

5. Word Stress
6. Syllabification
7. Rules of Word Stress
8. Intonation

UNIT - III

9. Situational Dialogues/ Role Play
10. Telephonic Communication
11. JAM

UNIT IV

12. Describing Persons/ places/ things
13. Oral Presentations
14. Debate

UNIT V

15. Group Discussion
16. Job application
17. Interview skills

Minimum Requirements for ELCS Lab:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system,

Projector, a digital stereo-audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
 - a) Speed – 2.8 GHZ
 - b) RAM – 512 MB Minimum
 - c) Hard Disk – 80 GB
- ii) Headphones of High quality

Suggested Software:

1. Clarity Pronunciation Power – Part I (Sky Pronunciation)
2. Clarity Pronunciation Power – part II
3. K-Van Advanced Communication Skills
4. Walden InfoTech Software.

REFERENCES:

1. A Textbook of English Phonetics for Indian Students 2nd Ed T. Balasubramanian. (Macmillian), 2012
2. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd
3. Speaking English Effectively, 2nd Edition Krishna Mohan & NP Singh, 2011. (McMillan).
4. A Hand book for English Laboratories, E.Suresh Kumar, P.Sreehari, Foundation Books, 2011.
5. Spring Board Success, Sharada Kouhik, Bindu Bajwa, Orient Blackswan, Hyderabad, 2010.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**

I B. Tech. – II Sem. (CE)

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**(16HS609) ENGINEERING CHEMISTRY LAB
(Common to CE, EEE & ME)**

Course Objectives:

- To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

Course Outcomes:

On completion of this course, students will have the knowledge in.

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

Any 10 of the following experiments has to be performed during the I year I Sem.

List of Experiments:

Determination of total hardness of water by EDTA method.

1. Determination of Copper by EDTA method.
2. Estimation of Dissolved Oxygen by Winkler's method.
3. Estimation of iron (II) using diphenylamine indicator (Dichrometry –Internal indicator method).
4. Determination of Alkalinity of Water.
5. Determination of acidity of Water.
6. Preparation of Phenol-Formaldehyde (Bakelite).
7. Determination of Viscosity of oils using Redwood Viscometer I.
8. Determination of Viscosity of oils using Redwood Viscometer II.
9. Determination of calorific value of gaseous fuels by Junker's Calorimeter.
10. Conductometric estimation of strong acid using standard sodium hydroxide solution.
11. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
12. Potentio metric determination of iron using standard potassium dichromate.
13. Colorometric estimation of manganese.
14. pH meter calibration and measurement of pH of water and various other samples.

REFERENCES:

1. *Vogel's Text book of Quantitative Chemical Analysis*, Sixth Edition – Mendham J et al, Pearson Education, 2012.
2. *Chemistry Practical– Lab Manual*, First edition, Chandra Sekhar KB, Subba Reddy GV and Jayaveera KN, SM Enterprises, Hyderabad, 2014.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**

I B. Tech. – II Sem. (CE)

**P C
4 2**

**(16CE102) APPLIED MECHANICS LAB
(Common to CE & ME)**

Course Objective:

- *To learn about polygon law of forces.*
- *To learn about Static friction and its concepts.*
- *To learn how to find centroid and Moments of Inertia of an objects.*
- *To learn about single and double Gear Crab.*

Course Outcomes:

Students undergoing this course are able to

- *Understand different laws of forces.*
- *Understand concepts of support reaction.*
- *Fundamentals of applied mechanics.*
- *Understand concepts of different types of pendulum.*

LIST OF EXERCISES:

- 1. Polygon Law of Coplanar Forces:** To verify the Polygon Law of Coplanar Forces for a concurrent force system.
- 2. Support Reactions of a Beam:** To find experimentally the reactions at the supports of a simply supported beam and verify the same with analytical values.
- 3. Bell Crank Lever:** To verify the Principle of moments using the Bell Crank lever apparatus.
- 4. Friction Plane:** To determine the coefficient of Static Friction between two surfaces.
- 5. Moment of Inertia of Flywheel:** To find screw jack and determine the coefficient of friction between the threads of the screw.
- 6. Compound Pendulum:** To estimate the acceleration due to gravity using a compound pendulum.
- 7. Single Gear Crab:** To understand the gear arrangement and establish the law of machine.
- 8. Double Gear Crab:** To compare the efficiency of Single and Double Gear Crab.
- 9. Differential Pulley Block:** To establish law of machine.
- 10. Differential Axle and Wheel:** To understand the velocity ratio of the machine and to interpret the law of machine.

***Minimum Eight experiments** must be conducted in the lab session.

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**(16HS612) ENGINEERING MATHEMATICS-III
(Common to all branches)**

Course Objectives:

- To train the students thoroughly in Mathematical concepts of Complex Analysis, Interpolation, Curve fitting, Numerical Differentiation and Integration and their applications
- To prepare students for lifelong learning and successful careers using mathematical concepts of Complex Analysis, Interpolation, Curve fitting, Numerical Differentiation and Integration and their applications
- To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information

Course Outcomes:

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

UNIT I

COMPLEX ANALYSIS-I: Analytic functions, Cauchy– Riemann equations, complex integration, Cauchy’s theorem, Integral formula, Evaluation of Integrals.

UNIT II

COMPLEX ANALYSIS-II: Singularities, poles, Residues, Residues theorem, Evaluation of real integrals of the types $\int_0^{2\pi} f(\cos \theta, \sin \theta) d\theta$, $\int_{-\infty}^{\infty} e^{imx} f(x) dx$ - conformal mapping – Bilinear transformations- Transformation of e^z , Z^2 , Sin z, and Cos z.

UNIT III

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: The Bisection Method, The Method of False Position, Newton-Raphson Method.

INTERPOLATION: Newton’s forward and backward interpolation formula, Lagrange’s interpolation formula.

UNIT IV

CURVE FITTING: Fitting of a straight line, Second degree curve, Exponential curve, Power curve by method of least squares.

NUMERICAL DIFFERENTIATION AND INTEGRATION: Trapezoidal rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule.

UNIT V

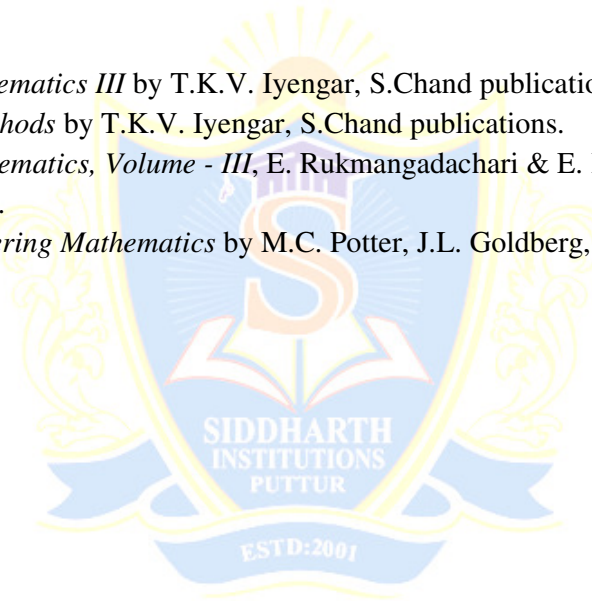
NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor's series, Picard's Method of successive Approximations, Euler's Method, Runge-Kutta second and fourth order methods.

TEXT BOOKS:

1. *Higher Engineering Mathematics*, B.S.Grewal, Khanna publishers.
2. *Advanced Engineering Mathematics*, Peter V.O'Neil, CENGAGE publisher.

REFERENCES:

1. *Engineering Mathematics III* by T.K.V. Iyengar, S.Chand publications.
2. *Mathematical Methods* by T.K.V. Iyengar, S.Chand publications.
3. *Engineering Mathematics, Volume - III*, E. Rukmangadachari & E. Keshava Reddy
Pearson Publisher.
4. *Advanced Engineering Mathematics* by M.C. Potter, J.L. Goldberg, Edward F.Aboufadel,
and Oxford.



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(16EE209) ELECTRICAL & MECHANICAL TECHNOLOGY

Course Objectives:

- To understand the basic fundamentals in Electrical Circuits.
- To study the construction, Principle of operation and performance of DC machine, AC machines and Transformer.
- To understand the principles of measuring instruments.

Course Outcomes:

- After completion of the course the student will be able to
- Understand the fundamentals of electrical circuits.
- Acquire the concept of all types of Electrical Machines like DC, AC, machines and Transformer.
- Know the principle of measuring instruments.

PART – A ELECTRICAL TECHNOLOGY

UNIT-I

FUNDAMENTALS OF ELECTRICAL QUANTITIES - MEASUREMENTS:

Definition for Conductor, Insulator & semi-Conductor - Basic Electrical Quantities and their units - Ohm's law - Resistance in series, parallel and series - parallel combinations - Units of work, power and energy. Calculation of Electricity bill for different types of consumers - Active and Passive circuits - Junction, branch and loop in circuits, Kirchoff's laws - Star - Delta configurations, star-delta transformations - Classification of measuring Instruments - Types of MI& MC Instruments - Definitions of accuracy, precision, error, resolution and sensitivity - types of errors.

UNIT-II

ELECTRICAL DOMESTIC WIRING - HAZARDS, FIRST-AID & SAFETY PRECAUTIONS:

Electrical Symbols - Size of wires & cables for domestic & Power loads - Types of Wires & Cables - Types & installation of House Wiring Systems & Accessories: Surface conduit wiring, CTS Wiring, Concealed Wiring, and PVC conduit wiring - Comparison of various wiring systems - Distribution fuse boards - Main switches – Different types of fuses and fuse carriers - Safety procedures - Electric shock and first aid, causes for fire hazards in Electrical installations - Requirements of good lighting different types of lamp fittings laws of illumination.

UNIT-III**ELECTRICAL INSTALLATION & ESTIMATION:**

Electrical installation testing - departmental procedure for testing before giving service connection - departmental procedure for obtaining service connection - Estimation of domestic lighting installation service main - types of wire - specification - quantity of materials required for service main – estimation and selection of interior wiring system suitable to a given building - number of circuits - calculation of length of wire and quantity of accessories required - estimates of materials for execution of the domestic wiring installation as per National Electrical act 2003 . Power wiring installation & drawing wiring layout for a big office building, electrical laboratory, big industry, big hotel with lift arrangement and a residential building with 2 bed room house. - estimation and costing upto 20 kVA calculation of load current based on ratings of various equipment's to be installed.

PART – B MECHANICAL TECHNOLOGY**UNIT IV**

Classification of IC Engines. - 4 stroke and 2 stroke engines comparison –Types of Air Compressors –working of air compressors. Simple vapor compression refrigeration system–Types of air conditioning systems-window air-split–. Central–packaged air conditioner–Ducting –Different types of ventilation system.

UNIT V

Transmission of power, Belt, Rope, Chain and gear drive-simple problems. Earth moving machinery and Mechanical handling equipment – bull dozers – power showels – Excavators – concrete mixer –Belt and bucket conveyers.

UNIT VI

WELDING PROCESSES: Introduction to welding classification of welding processes, Oxyacetylene welding – equipment, welding fluxes and filler rods, Gas cutting, Introduction to arc welding – Manual metal arc welding. Submerged arc welding, TIG and MIG processes, soldering and brazing Importance, comparison and applications.

TEXT BOOKS:

1. Electrical Technology, B.L. Theraja, S. Chand Publishers.
2. Elements of Mechanical Engineering by S.N. Lal, Cengage Learning, 2013
3. Mechanical Technology, Khurmi.

REFERENCES:

1. Mechanical Technology, Kondandaraman C.P.
2. Construction Planning, Equipment and methods – Purify.
3. Introduction to Electrical Engineering, M.S. Naidu & S. Kamakshaiah, TMH

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(16CE103) STRENGTH OF MATERIALS – I

Course Objectives:

- To learn about simple stresses and strains and their applications
- To learn how to find shear force and bending moment and construction of SFD & BMD
- To understand about the concept of simple bending and shear stress distribution
- To learn about deflections of Beams by using different methods
- To learn about columns and struts and their applications

Course Outcomes:

Students undergoing this course are able to:

- The students would be able to understand the behaviour of materials under different stress and strain conditions
- The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading
- The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions
- Determine shear stress in the shaft subjected to torsional moments

UNIT-I

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity – Types of stresses and strains – Hooke's law– Factor of safety– Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.

STRAIN ENERGY: Resilience – Gradual, sudden, impact and shock loadings- Simple Applications.

UNIT-II

SHEAR FORCE AND BENDING MOMENTS: Types of supports and beams – Shear force and bending moment diagrams for cantilever, simply supported and over hanging beams with point loads, uniformly distributed load, uniformly varying loads and couples – Relationship between bending moment, shear force and loading.

UNIT-III

THEORY OF SIMPLE BENDING: Assumptions in the theory of simple bending – Derivation of bending equation: $M/I = f/y = E/R$ –Neutral axis – Determination bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam.

SHEAR STRESS DISTRIBUTION: Derivation of formula – Shear stress distribution in rectangular, triangular, circular, I and T sections.

UNIT-IV

DEFLECTIONS OF BEAMS: Differential equation of deflected beam – Slope and deflection at a point - Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, UDL and uniformly varying load- Mohr's theorems – Moment area method – application to simple cases.

UNIT-V

CONJUGATE BEAM METHOD: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TORSION OF CIRCULAR SHAFTS AND SPRINGS: Theory of pure torsion - Torsional theory applied to circular shafts – Power transmission - Close and open coiled helical springs under axial loads and axial twist – Carriage springs.

TEXT BOOKS:

1. *Strength of Materials (Mechanics of Solids)*, 6th Edition, Er. R.K. Rajput, S. Chand Publishing
2. *A Textbook of Strength of Materials*, 6th Edition, Dr. R. K. Bansal, Laxmi Publications

REFERENCES:

1. *Mechanics of Materials*, Revised, 2016 Edition, Dr. B. C. Punmia, Er. Ashok Kr. Jain, Dr. Arun Kumar Jain, Laxmi Publications
2. *Strength of Materials*, 3rd Edition, R. Subramanian, Oxford University Press
3. *Strength of Materials*, 24th Edition, R. S. Khurmi, S. Chand Publishing
4. *Strength of Materials*, 11th Edition, Sadhu Singh, Khanna Publishers

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(16CE105) SURVEYING

Course Objectives:

- To train the students on the basic principles of surveying for the measurement of distances and areas
- To measure bearing of a line with prismatic compass and horizontal angles between the lines and vertical angles of elevated or depressed objects by transit theodolite
- To apply for horizontal and vertical distance computation by tachometry survey
- To set out different types of curves in the field

Course Outcomes:

- be in a position to apply the basic principle of surveying and usage of surveying instruments in all civil engineering activities, including the construction of buildings, bridges, roads and high ways, pipe lines, dams, ports and harbours
- be an expert of demarcation of ownership and / or delimitation of land, property, etc. through surveying process
- surveying techniques to collect data for planning, designing and execution, able to employ green field
- use total station and able to assess the electromagnetic distances

UNIT – I

PRINCIPLES OF SURVEYING: Surveying – Definition; primary divisions, classification - Principles of surveying - Scales used for maps and plans - Duties of a surveyor - Errors: accuracy and precision - Sources and types of errors.

ANGLES, AZIMUTHS AND BEARINGS: Units of angle measurement - Meridians, azimuths bearings - Magnetic declination, Local attraction and corrections to angles and bearing of lines.

TYPES OF SURVEYING: Introduction to Chain, Compass and Plan Table Survey.

UNIT - II

LEVELLING: Introduction - Basic definitions - Methods of leveling - Leveling instruments: dumpy level, levelling staff - Temporary adjustments of dumpy level - Theory of simple and differential leveling - Level field book - Classification of direct leveling methods - Reciprocal leveling - Profile leveling - Cross sectioning - Curvature and Refraction - Difficulties in leveling - Errors in leveling, degree of precision.

CONTOURING: Introduction - Contour interval - Characteristics of contours - Methods of locating contours - Direct and indirect methods: Interpolation and sketching of contours - Contour gradient- Uses of contour maps.

UNIT - III

THEODOLITE: Vernier Theodolite: Basic definitions - Fundamental lines and desired relations - Temporary adjustments - Measurement of a horizontal angle - Repetition and reiteration methods of horizontal angle measurement - Measurement of vertical angle - Sources of errors in Theodolite survey – Traversing - Omitted measurements - Closing error - Determination of the level of the top of an object, when its base is accessible and inaccessible - Determination of the height of the object when the two instrument stations are not in the same vertical plane.

TACHEOMETRIC SURVEYING: Definitions - Advantages of tachometric surveying - Basic systems of tachometric measurement - Determination of constants K and C - Inclined sight with staff vertical - Inclined sight with staff normal to the line of sight - Movable hair method - Tangential method.

UNIT - IV

CURVES: Simple curves – Definitions and notations - Designation of a curve - Elements of simple curves - Methods of setting simple curves: Rankine’s method, Two theodolite method - Compound curves – Elements of compound curve - Reverse curves – Elements of reverse curve - Relationship between various elements.

UNIT - V

ELECTRONIC DISTANCE MEASUREMENTS: Introduction – Basic Concepts- Electromagnetic waves - Basic definitions - Phase of the wave, units, types of waves - Distance from measurement of transit time - Computing the distance from the phase differences - EDM instruments - Electronic theodolites - Total station: models, fundamental measurements, recording, traversing, data retrieval.

TEXT BOOKS:

1. *Surveying Vol-I*, 16th Edition, Punmia B. C, Laxmi Publications.
2. *Surveying Vol-II*, 15th Edition, Punmia B.C, Laxmi Publications.
3. *Surveying and Levelling*, 2nd Edition, Basak N.N, Tata McGraw Hill Publishing Company Ltd.

REFERENCES:

1. *Surveying and levelling part I & II*, 23rd Edition, Kanetkar.T.P. & S.V. Kulkarni, Puna Vidyarthi Girha, Prakashan,
2. *Fundamentals of Surveying and Levelling*, 1st Edition, R. Subramanian, Oxford University Press, India
3. *Surveying Vol-I*, 10th Edition, Arora K. R, Rajsons Publications Pvt. Ltd.

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(16CE106) FLUID MECHANICS

Course Objectives:

- To understand the basic concepts of Fluid properties and fluid statics
- To understand the applications of fluid kinematics and dynamics
- To understand the behavior of pipe flow and losses in pipe flow
- To understand the concepts of flow measurements and boundary layer flows

Course Outcomes:

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

- determine the properties of fluid like pressure and their measurement.
- compute forces on immersed plane and curved plates.
- apply continuity equation and energy equation in solving problems on flow through conduits.
- compute the frictional loss in laminar and turbulent flows.

UNIT-I

Fluid Properties: Dimensions and units - Definition of a fluid – Physical properties of fluids- Density, Specific weight, Specific volume, Specific gravity, Compressibility, Vapour pressure, Surface tension and capillarity and viscosity.

Fluid Statics: Pascal's law - Pressure variation in a static fluid – Atmospheric, gauge and absolute pressures, Measurement of pressure – Piezometer – U-tube and inverted U-tube manometers and Bourdon's pressure gauge, hydrostatic forces on plane and curved surfaces, center of pressure.

UNIT-II

Fluid Kinematics: Types of flow – Streamline – Streak line – Path line – Stream tube – Control volume – Continuity equation in one and three dimensional forms – Stream function and velocity potential function – Flow net – Acceleration of a fluid particle – Local and convective accelerations – Tangential and normal accelerations.

Fluid Dynamics: Euler's equation of motion along a streamline – Bernoulli's energy equation – Energy correction factor – Impulse momentum equation – Momentum correction factor – Force on a bend – Energy gradient line – Hydraulic gradient line – Analysis of free liquid jets – Forced vortex and free vortex.

UNIT-III

Analysis of pipe Flow: Forces acting on open pipe and buried pipe, minor losses in pipe flow – Pipes in series and parallel – Siphon – Pipe networks – Velocity distribution for turbulent

flow in pipes – Rough and smooth pipes – Darcy Welsbach equation – Variation of friction factor – Moody's chart.

UNIT-IV

Flow Measurement: Velocity measurement by Pitot tube and Pitot static tube – Discharge measurement by Venturimeter and orifice meter – Orifices and mouthpieces – Flow over rectangular, triangular, trapezoidal and stepped notches - Broad crested weirs.

UNIT-V

Laminar Flow: Reynolds' experiment – Regimes of flow - Laminar flow, turbulent flow, transitional flow – Reynolds' number – Laminar flow through circular pipes – Hagen Poiseuille equation – Laminar flow through parallel plates - Introduction of Hardy Cross method.

Boundary Layer Theory: Concept of boundary layer flow- Boundary layer along a thin flat plate - Boundary layer separation and its control - Flow around submerged objects-Drag and lift.

TEXT BOOKS:

1. *Hydraulics and Fluid Mechanics Including Hydraulics Machines (A-4-Size)*, 20th Edition, Dr. P.N. Modi & Dr. S.M. Seth, Standard Book House
2. *A Textbook of Fluid Mechanics and Hydraulic Machines*, 9th Edition, Dr. R. K. Bansal, Laxmi Publications

REFERENCES:

1. *Fluid Mechanics*, 9th Edition, Victor Streeter, E. Benjamin Wylie, K.W. Bedford, McGraw Hill Education
2. *Fluid Mechanics and Machinery*, 1st Edition, C.S.P. Ojha, P.N. Chandamouli & R. Berndtsson, Oxford University Press
3. *Fluid Mechanics and Hydraulic Machines*, 1st Edition, S. C. Gupta, Pearson India Education Services Pvt. Ltd.
4. *Fluid Mechanics and Machinery*, 1st Edition, Rama Durgaiah D., New Age International

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(16CE107) BUILDING MATERIALS & CONSTRUCTION

Course Objectives:

- To introduce traditional and modern construction materials.
- To impart knowledge of building components.
- To impart knowledge of construction practices.

Course Outcomes:

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

- understand properties of various construction materials and their manufacturing process.
- access the quality of construction materials.
- supervise the construction activities.

UNIT I

STONES: Classification of rocks – Quarrying of stones: tools, methods, precautions – Uses of stones – Characteristics of good building stones.

BRICKS: Classification of bricks – Characteristics of good bricks – Ingredients of good brick earth – Harmful substances in brick earth – Manufacturing of bricks – Defects in bricks.

WOOD: Classification of trees – Classification of timber – Structure of timber – Characteristics of good timber – Seasoning of timber – Defects, diseases and decay of timber.

UNIT II

CEMENT: Properties of cement – Composition of ordinary cement – Manufacturing of ordinary cement - field tests on cement – Laboratory tests on cement – Storage of cement.

PAINTS & DISTEMPERS: Composition of oil paint – Preparation of paint – Painting plastered surfaces – Painting wood surfaces – Painting metal surfaces – Defects – Distemper – White wash and color wash – Varnish.

MISCELLANEOUS MATERIALS: Pig iron – Cast iron – Steel – Glass – Asbestos – Gypsum – Bitumen – Rubber.

UNIT III

FOUNDATION: Functions of foundation – Requirements of good foundation – Type of foundation – Foundation failures and Remedial measures.

MASONRY: Definition of terms used in masonry – Classification of stone masonry – English and Flemish bonds in brick masonry – Defects in brick masonry – Comparison of brick and stone masonry.

UNIT IV

FLOORS: Components of floor – Types of floors: Cement concrete flooring, mosaic flooring, marble flooring, tiled flooring, timber flooring and rubber flooring.

ROOFS: Pitched, flat and curved roofs - Lean-to-Roof, coupled roofs, Trussed roofs- King and queen post trusses - RCC roofs, madras terrace / shell roofs.

DOORS AND WINDOWS: Location of doors and windows – Types of doors – Types of windows.

UNIT V

LINTELS & ARCHES: Classification of lintels – Terms used in arches – Classification of arches.

PLASTERING AND POINTING: Types of mortars for plastering – Methods of plastering – Defects in plastering – Pointing.

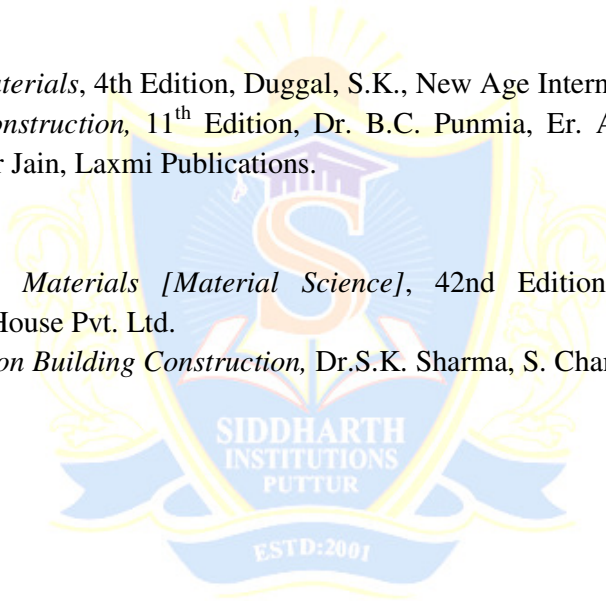
STAIRS: Technical terms – Requirements of good stair – Classification of stairs.

TEXT BOOKS:

1. *Building Materials*, 4th Edition, Duggal, S.K., New Age International
2. *Building Construction*, 11th Edition, Dr. B.C. Punmia, Er. Ashok Kumar Jain, Dr. Arun Kumar Jain, Laxmi Publications.

REFERENCES:

1. *Engineering Materials [Material Science]*, 42nd Edition, Rangwala, Charotar Publishing House Pvt. Ltd.
2. *A Textbook on Building Construction*, Dr.S.K. Sharma, S. ChandPublishers.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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(16CE107) SURVEYING LAB-I

Course Objectives:

- To train the students in plotting of land by chain and tape plan table surveys
- To train the students in determine distance between two inaccessible points by prismatic compass and plane table and the odolite methods
- To train the students in plotting of contour maps by conducting leveling survey and total station and tachometric methods

Course Outcomes:

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

- gain knowledge and expertise in operation of various survey instruments for computation of area of a land.
- successfully carry out survey work in all civil Engineering projects, including the construction of buildings, roads and highways, rail track laying with curves, pipe lines, dams, ports and harbor as well as delimitation of land and property, etc.

LIST OF EXPERIMENTS:

1. Survey of an area by chain survey (Closed traverse) & Plotting.
2. Chaining across obstacles.
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (Closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey.
6. Two point and three point problems in plane table survey.
7. Traversing by plane table survey.
8. Compound leveling (differential leveling).
9. An exercise of L.S. and C.S. and plotting.
10. Contour survey of reservoir.
11. Contour survey of a highway.

LIST OF EQUIPMENT:

1. Chains, tapes, ranging rods, cross staff, arrows.
2. Compasses and Tripods, Optical square.
3. Plane tables, Alidade, Plumbing fork, trough compasses.
4. Leveling instruments and leveling staves.

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**P C
4 2**

(16CE109) STRENGTH OF MATERIALS LAB

Course Objectives:

- To learn the testing procedures of mild steel by tension, direct shear, torsion, hardness tests
- To learn the concept of modulus elasticity, and to know how to measure deflection of beams
- To learn the compressive strength of wood, concrete stone and bricks
- To learn the testing procedures for burnt clay bricks and comparison with BIS standard of brick

Course Outcomes:

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

- estimate Young's modulus, tensional rigidity of mild steel rods
- know the hardness of mild steel and HYSD specimens
- analyze the strength of wood, concrete, stone and bricks
- assess the quality of wood, concrete, stone and bricks

LIST OF EXPERIMENTS:

1. Bending test on simple support beam.
2. Compression test on wood or Brick
3. Impact test on metal specimen (Izod and Charpy)
4. Compression test on helical spring.
5. Tension test on mild steel rod.
5. Torsion test on mild steel rod.
6. Impact test.
7. Shear test.
8. Continuous beam – deflection test.
9. Hardness test on metals (Rockwell and Brinell Hardness Number Tests).
10. Verification of Maxwell's Reciprocal theorem on beams.

LIST OF EQUIPMENT:

1. UTM for conducting tension test on rods.
2. Brinnell's/Rock well's hardness testing machine.
3. Compression testing machine.
4. Izod Impact machine.
5. Steel beam for flexure test.
6. Beam setup for Maxwell's theorem verification.
7. Torsion testing machine.

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(COE-I) COMPREHENSIVE ONLINE EXAMINATION -I

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**(16CS503) DATA STRUCTURES THROUGH C
(AUDIT COURSE)
(Common to CE, EEE, ME & ECE)**

Course Objectives:

- Understand different data structures
- Understand searching and sorting techniques

Course Outcomes:

- At the end of the course, students will be able to:
- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

UNIT I

INTRODUCTION AND OVERVIEW: One Dimensional array- Multi Dimensional array- pointer arrays. **Linked lists:** Definition- Single linked list- Circular linked list- Double linked list- Circular Double linked list- Application of linked lists.

UNIT II

STACKS: Introduction-Definition-Representation of Stack-Operations on Stacks-Applications of Stacks. **Queues:** Introduction, Definition- Representations of Queues- Various Queue Structures- Applications of Queues.

UNIT III

TREES: Basic Terminologies- Definition and Concepts- Representations of Binary Tree- Operation on a Binary Tree- Types of Binary Trees-Binary Search Tree, Heap Trees

GRAPHS: Introduction- Graph terminologies- Representation of graphs- Operations on Graphs- Application of Graph Structures: Shortest path problem- topological sorting.

UNIT IV

SORTING : Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort- Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort- Sorting by Exchange- Bubble Sort- Shell Sort- Quick Sort-Sorting by Mergin: Simple Merging-Binary Merge-Merge Sort.

UNIT V

SEARCHING: Linear Search Techniques: Linear Search with Array- Linear Search with Linked List- Linear Search with ordered list- Binary Search- Fibonacci Search.

TABLES: Hash Tables: Hashing Techniques- Collision Resolution Techniques- Closed Hashing- Open Hashing.

TEXT BOOKS:

1. *Classic Data Structures*, Second Edition by Debasis Samanta, PHI.
2. *Data Structures A Pseudo code Approach with C*, Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning.

REFERENCES:

1. *Fundamentals of Data Structures in C* – Horowitz, Sahni, Anderson-Freed, Universities Press, Second Edition.
2. *Outlines – Data Structures* – Seymour Lipschutz – McGrawHill- Revised First Edition.
3. *Data structures and Algorithms using C++*, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

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**(16HS613) PROBABILITY & STATISTICS
(Common to EEE, CE, ME & CSE)**

Course Objectives:

- *To train the students thoroughly in Mathematical concepts fundamentals of probability, test of hypothesis, Test of significance and ANOVA*
- *To prepare students for lifelong learning and successful careers using mathematical concepts of probability, test of hypothesis, Test of significance and ANOVA*
- *To develop the skill pertinent to the practice of the mathematical concepts including the Student abilities to formulate and modeling the problems, to think creatively and to Synthesize information*

Course Outcomes:

At the end of the course, students would be expected to:

- *Have acquired ability to participate effectively in group discussions*
- *Have developed ability in writing in various contexts*

Have acquired a proper level of competence for employability

UNIT-I

Probability: Introduction, Conditional probability, Baye's theorem, Random variables, Discrete and continuous Distributions, Expectation, Variance, Moments, Moment generating functions

UNIT-II

Distributions, Binomial, Poisson, Normal, Uniform, Exponential and Gamma distributions, related properties and applications

UNIT-III

Test of Hypothesis: Population and Sample, Confidence interval of mean from Normal distribution, Null and Alternative hypothesis, Level of significance

Test of significance: Test based on normal distribution, Z test for means and proportions, Small samples t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).

UNIT-IV

Analysis of variance one way classification and two way classification (Latin square Design and RBD)

UNIT-V

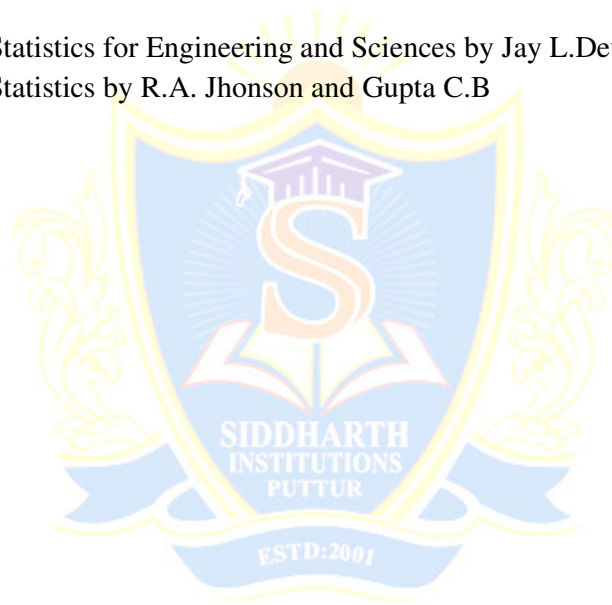
Statistical Quality Control: Concept of quality of a manufactured product, Defects and Defectives, Causes of variations, Random and assignable, The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics, Constructions and operation of X- bar Chart, R-Chart, P-Chart and C-Chart.

TEXT BOOKS:

1. Statistical methods by S.P. Gupta, S.Chand publications.
2. Probability & Statistics by T.K.V. Iyengar, S.Chand publications.

REFERENCES:

1. Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2. Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.
3. Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.
4. Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
5. Probability and Statistics by R.A. Jhonson and Gupta C.B



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**(16HS605) ENVIRONMENTAL STUDIES
(Common to All Branches)**

Course Objectives:

- Students have got an idea about the importance of pollution free air, water, soil and food.
- They know about global environmental problems like Acid Rains, Global Warming, Green House Effects, Ozone layer depletion.
- To understand the impacts of developmental activities and mitigation measures along with the environmental policies and regulations.
- To recognize major concepts in environmental studies and demonstrate in-depth understanding the environment.

Course Outcomes:

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

UNIT- I

INTRODUCTION:

Definition, Scope and Importance-Need for Public Awareness

NATURAL RESOURCES:

Classification of resources-Forest resources: Use and over-exploitation, deforestation-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 –Energy resources: Renewable and Non- Renewable sources of energy- Solar energy, Hydro electrical energy, Wind energy, Nuclear energy, etc.

UNIT-II

ECOSYSTEMS:

Concept of an ecosystem– structural features of ecosystem- Producers, Consumers and Decomposers–Biogeochemical cycles- Ecological Succession-Food chains, food webs and

ecological pyramids – Energy flow in the ecosystem-Types of ecosystems (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems.

UNIT-III

BIODIVERSITY AND ITS CONSERVATION:

Introduction, Definition, genetic, species and ecosystem diversity, Bio-geographical classification of India, India as a Mega-Diversity Nation, Hot spots of biodiversity, Value of biodiversity, threats to biodiversity, endemic, endangered and extinct species of India, In-Situ and Ex-situ conservation of biodiversity.

UNIT-IV

ENVIRONMENTAL POLLUTION AND GLOBAL ENVIRONMENTAL ISSUES:

Natural Disasters: Droughts, Floods, Cyclone, Landslides, Earthquake,

Pollution episodes: Air pollution, Water pollution, Land pollution, Noise pollution, Automobile pollution and Nuclear pollution –Effects-Global warming, Acid Rain and Ozone layer depletion and controlling measures.

Global Environmental Issues: Population Growth, Urbanizations, Land Management, Water and Waste Water Management. Climate change and impacts on human environment

Solid Waste Management: causes, effects and control measures of Municipal solid wastes – E-waste and management, Role of an individual in prevention of pollution – pollution case studies.

UNIT-V

ENVIRONMENTAL LEGISLATION, LAWS, POLICIES FOR SUSTAINABLE DEVELOPMENT:

Environmental Legislation, Environmental Protection act – Air Prevention and Control of Pollution act–Water Prevention and control of Pollution act– Wildlife protection act – Forest conservation act – Municipal Solid Waste management, International conventions/Protocols: Earth summit, Kyoto protocol and Montreal Protocol. From Unsustainable to sustainable development, Role of NGO's for Sustainable development, Concepts of Green belt development, Role of IT in Environment-Remote Sensing and GIS methods for Sustainable development.

Field work- visit to a local area to document environmental assets-river forest grassland/hill, mountain and polluted sites (urban/rural/industrial/Agriculture) - study simple ecosystems (pond/river/hill slopes)

TEXT BOOKS:

1. *A Text book on Environmental Sciences* by Kaushik A and Kaushik C P 5th edition, New age international publishers, 2015.
2. *Text Book of Environmental Science and Technology* by Anji Reddy M, BS Publications, 2007.

REFERENCES:

1. *Environmental Studies*, Anil Kumar and Arnab Kumar De, New Age International Publishers, New Delhi, 3rd Edition 2015.
2. *Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards*, R.K. Trivedi, Vol.I and II, Enviro Media.
3. *Environmental Studies* by Mukkanthi K, S. Chand Publishers, 2010.
4. *Environmental Studies-From Crisis to Cure*, Rajagopalan.R Oxford University Press, 2005.
5. *Text Book of Environmental Studies*, Erach Bharucha, University Grants Commission, University Press (India) Pvt. Ltd., Hyderabad,2010.



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(16CE110) BUILDING PLANNING & DRAWING

Course Educational Objectives:

- This subject provides the knowledge of building by laws, registration, planning of various types of buildings
- This subject also provides drawing of different sign convention of various Civil Engineering Materials, Doors, windows, tiles of roof, building plans etc.

Course Outcomes:

Students undergoing this course are able to

- understand Building Byelaws
- planning a residential & public building
- plot the drawing for approval

PART-A

UNIT -I

PLANING OF BUILDINGS: Types of buildings: types of residential buildings - Site selection for residential building - Orientation of buildings: aspect; prospect; privacy - Furniture requirement: grouping; circulation, sanitation, lighting, ventilation, cleanliness, flexibility, elegancy, economy, practical considerations.

BUILDING BYELAWS AND REGULATIONS: Introduction – Terminology - Objectives of building byelaws - Minimum plot sizes - Open space requirements - Plinth area, floor area, carpet area - Floor area ratio (FAR), Floor space Index (FSI) - Areas for different units - Principles underlying building byelaws - Built up area limitations – Height of buildings - Wall thickness - Lighting and ventilation requirement - Safety from fire - Drainage and sanitation - Applicability of the bye-laws.

UNIT –II

PLANNING OF RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings – Requirements of different rooms and their grouping – Characteristics of various types of residential buildings

PLANNING OF PUBLIC BUILDING: Planning: educational institutions, hospitals, office buildings, banks, industrial buildings, hotels and hotels, hostels, bus station.

UNIT -III

BUILDINGS: SAFETY AND COMFORT: Aspects of safety- Structural, health, fire and constructional safety - Components of building automation system - HVAC, electrical

lighting, Security - Fire-fighting, Communication etc.- Design for thermal comfort - Ventilation comfort - Air conditioning comfort - Lighting comfort - Noise and acoustic comfort.

PART-B

UNIT -IV

SIGN CONVENTIONS AND BONDS: Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminum alloys etc., lead, zinc, tin, and white lead etc., earth, rock, timber and marble, English bond & Flemish bond, odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

DOORS WINDOWS, VENTILATORS AND ROOFS: Paneled door– Paneled and glazed door Glazed windows – Paneled windows - Swing ventilator – Fixed ventilator; Couple roof – Collar roof - Kind post truss – Queen post truss.

UNIT –V

Given line diagram with specification to draw plan, section and elevation of:

1. Residential Building
2. Hospital
3. Schools
4. Post office

FINAL EXAMINATION PATTERN: The end examination paper should consist of Part- A and Part-B. Part- A consists of three questions with either or choice from three units in planning portion. Each question carries 10 marks. Total marks for Part-A is 30 marks. Part- B consists of two questions with either or choice from drawing portion. Question from unit-IV carries 5 marks and question from Unit-V carries 20 marks. Total marks for Part-B is 25 marks.

TEXT BOOKS:

1. *Building Planning, Designing and Scheduling*, Gurcharan Singh, Standard Publisher Distributors
2. *Building Planning and Design*, 8th Revised Edition, N. Kumaraswamy and A. Kameswara Rao, Charotar Publishing House Pvt. Ltd.

REFERENCES:

1. *Building by Laws* by State and Central Governments and Municipal Corporations.
2. National Building Code.
3. *Building Drawing with an Integrated Approach to Built Environment*, 4th Edition, M. Shah, C. Kale, S. Patki, Tata McGraw Hill Education.

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(16CE111) STRENGTH OF MATERIALS – II

Course Objectives:

- To understand the basic concepts of principal stresses and strains and their failures.
- To understand the applications of thin cylinders and thick cylinders and to learn the applications of torsion of circular shafts and springs.
- To understand the behaviour of different types of beams.
- To understand the theories of Failures and unsymmetrical bending of beams.

Course Outcomes:

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

- determine different stresses developed in thin and thick cylinders.
- visualize the behaviour of column for combined bending and axial loading.
- determine the behaviour of unsymmetrical bending in members.

UNIT – I

PRINCIPAL STRESSES AND STRAINS: Introduction – Stresses on an inclined section of a bar under axial loading – Compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

THEORIES OF FAILURES: Various theories of failures like Maximum Principal stress theory – Maximum principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

UNIT – II

THIN CYLINDERS & THICK CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – Hoop, longitudinal and volumetric strains – Changes in dia, and volume of thin cylinders – Thin spherical shells - Introduction Lamé's theory for thick cylinders – Derivation of lamé's formulae – Distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

UNIT – III

DIRECT AND BENDING STRESS: Stresses under the combined action of direct loading and bending moment - Core of a section – Determination of stresses in the case of chimneys,

retaining walls and dams – Conditions for stability – Stresses due to direct loading and bending moment about both axes.

SPRINGS: Introduction – Types of springs – Deflection of close and open coiled helical springs under axial pull and axial couple – Springs in series and parallel – Carriage or leaf springs.

UNIT – IV

COLUMNS AND STRUTS : Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler’s theorem for long columns – assumptions – derivation of Euler’s critical load formulae for various end conditions – Equivalent length of a column – Slenderness ratio – Euler’s critical stress – Limitations of Euler’s theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry’s formula.

UNIT – V

UNSYMMETRICAL BENDING: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid - Location of neutral axis – Deflection of beams under unsymmetrical bending.

BEAMS CURVED IN PLAN: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semicircular beam simply-supported on three equally spaced supports.

TEXT BOOKS:

1. *Strength of Materials (Mechanics of Solids)*, 6th Edition, Er. R.K. Rajput, S. Chand Publishing
2. *A Textbook of Strength of Materials*, 6th Edition, Dr. R. K. Bansal, Laxmi Publications

REFERENCES:

1. *Mechanics of Materials*, Revised, 2016 Edition, Dr. B. C. Punmia, Er. Ashok Kr. Jain, Dr. Arun Kumar Jain, Laxmi Publications
2. *Strength of Materials*, 3rd Edition, R. Subramanian, Oxford University Press
3. *Strength of Materials*, 24th Edition, R. S. Khurmi, S. Chand Publishing
4. *Strength of Materials*, 11th Edition, Sadhu Singh, Khanna Publishers

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(16CE113) HYDRAULICS & HYDRAULIC MACHINERY

Course Objectives:

- To relate the theory and practice of problems in hydraulic engineering
- To learn the behavior of types of flows, types of channels
- To learn the different hydraulic models
- To learn the basics of turbo machinery, hydraulic turbines and performance of turbines

Course Outcomes:

- analyze fluid flows in open channel hydraulics and devices such as weirs and flumes.
- design open channels for most economical sections like rectangular, trapezoidal and circular sections
- measure velocity through instruments in open channel and pipe flow
- select the type of turbine required with reference to available head of water and discharge

UNIT-I

OPEN CHANNEL FLOW

UNIFORM FLOW: Introduction - Differences between pipe flow and open channel flow - Classification of flows - Types of channels - Flow analysis: The Chezy's equation, Empirical formulae for the Chezy's constant - Hydraulically efficient channel sections.

NON-UNIFORM FLOW: Concept of specific energy: Specific energy curves - Critical flow - Critical flow in a rectangular channel - Critical slope - Discharge curve - Different slope conditions - Channel transitions - Specific force - Specific force curve.

UNIT-II

GRADUALLY VARIED FLOW: Introduction - Dynamic equation - Dynamic equation for GVF in wide rectangular channel - Classification of channel bottom slopes - Surface profiles - Characteristics of surface profiles - Back water curves and Draw down curves - Examples of various types of water surface profiles - Control section - Computation of surface profiles by step method.

RAPIDLY VARIED FLOW: Hydraulic jump - Elements and characteristics of hydraulic jump - Hydraulic jump in rectangular channels Height and length of the jump - Energy loss in a hydraulic jump - Types of hydraulic jump Applications of hydraulic jump.

UNIT III

IMPACT OF JETS: Hydrodynamic force of jets on stationary and moving flat inclined and curved vanes - jet striking centrally and at tip - Velocity triangles at inlet and outlet - Expressions for work done and efficiency- Angular momentum principle - Torque and head transferred into dynamic machines.

UNIT-IV

HYDRAULIC TURBINES-I: Introduction - Layout of Hydro-electric power plant - Types of hydro power plants - Head and efficiencies of hydraulic turbines -Classification of turbines - Pelton wheel: parts - Velocity triangles, work done and efficiency - Design of Pelton wheel - Radial flow reaction turbines -Francis turbine: main components and working -Work done and efficiencies - Design proportions - Design of Francis turbine runner.

HYDRAULIC TURBINES-II: Kaplan turbine: main components and working - Working proportions - Draft tube: theory and efficiency - Specific speed -Cavitation: causes, effects - Unit quantities and performance of characteristic curves of a turbine.

UNIT-V

HYDRAULIC PUMPS: Introduction - Component parts and working of a centrifugal pump, Work done by the impeller: heads, losses and efficiencies, minimum starting speed, Priming; specific speed, Cavitation effects, Multistage centrifugal pumps, troubles and remedies- Reciprocating pumps.

DIMENSIONAL ANALYSIS AND SIMILITUDE: Introduction – Dimensions: dimensional homogeneity - Methods of dimensional analysis- Rayleigh’s method - Buckingham - Pi theorem. Similitude - Types of Similarities. Model Laws.

TEXT BOOKS:

1. *Flow in Open Channels*, 3rd Edition, K Subramanya, Tata McGraw-Hill Publishing Company Limited.
2. *Hydraulics and Fluid Mechanics Including Hydraulics Machines (A-4-Size)*, 20th Edition, Dr. P.N. Modi & Dr. S.M. Seth, Standard Book House
3. *A Textbook of Fluid Mechanics and Hydraulic Machines*, 9th Edition, Dr. R. K. Bansal, Laxmi Publications

REFERENCES:

1. *Fluid Mechanics*, 9th Edition, Victor Streeter, E. Benjamin Wylie, K.W. Bedford, McGraw Hill Education
2. *Fluid Mechanics and Machinery*, 1st Edition, C.S.P.Ojha, P.N. Chandamouli & R. Berndtsson, Oxford University Press
3. *Fluid Mechanics and Hydraulic Machines*, 1st Edition, S. C. Gupta, Pearson India Education Services Pvt. Ltd.
4. *Fluid Mechanics and Machinery*, 1st Edition, Rama Durgaiyah D., New Age International

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(16CE114) SURVEYING LAB-II

Course Objectives:

- To introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works
- To set out simple curves for high ways and railways and to determine height of remote objective, horizontal distance and coordinates of points using total station

Course Outcomes:

Students undergoing this course are able to

- gains in accurate measurement of horizontal and vertical angles by theodolite and total station
- attains skills in computing the horizontal as well as vertical distance using tangential tachometry and expertise in handling of dumpy level, theodolite and total station for developing contour maps and longer sighting of objective distance and difference in elevation

LIST OF EXPERIMENTS:

1. Study of theodolite in detail – practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Determination of height of building by trigonometric survey
4. Determination of height of hill by trigonometric survey
5. Heights and distance using Principles of tachometric surveying
6. Curve setting by offsets from long chord.
7. Curve setting by deflection angle method
8. Curve setting by two theodolite method.
9. Setting out works for buildings & pipe lines.
10. Determination of area using total station.
11. Traversing using total station.
12. Contouring using total station.
13. Determination of remote height using total station.
14. Distance, gradient, Diff. height between tow inaccessible points using total stations.

LIST OF EQUIPMENT:

1. The odolite and leveling staffs.
2. Tachometers.
3. Total station.

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(16CE115) COMPUTER AIDED DRAWING LAB

Course Objectives:

- A Student will able to know how to apply engineering drawing using computers.
- A student can understand about the scope of Auto CAD software.
- A student will know what is plan and how it should draw in Auto CAD software.
- To learn about applications and advantages of Auto CAD.
- To learn about the basic commands of Auto CAD.

Course Outcomes:

- The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software's.
- Draw the symbols and plan of a residential building using Auto CAD Software.

COURSE CONTENT:

1.0 Introduction to Computer Aided Drafting (CAD):

- 1.1 About Auto CAD.
- 1.2 Computer graphics.
- 1.3 Definition of CAD.
- 1.4 Applications of CAD.
- 1.5 Advantages of CAD
- 1.6 Introduction to Auto CAD as drafting package.
- 1.7 Hardware requirements.

2.0 Practice on Auto CAD:

- 2.1 Graphical User Interface.
- 2.2 Study of drawing editor screen.
- 2.3 List out methods to access Auto CAD commands.
- 2.4 Practice of setting up of drawing area using utility commands & using setting commands.
- 2.5 Practice of File Management New, Open, Save, Save As, Export, Print, Publish, Drawing utilities, Units.
- 2.6 Practice of Geometrical commands line, Polyline, Circle, Erase, Oops, Snap, Arc, Ellipse, Polygon, Spline, Ellipse, Rectangle, and Donut.
- 2.7 Draw the given geometrical figures using draw commands
- 2.8 Practice of Modify Commands Move, Copy, Array, Break, Mirror, Offset, Scale, Rotate, Trim, Extend, Stretch, Solid, Fillet, Chamfer, Explode.
- 2.9 Draw the given figures using draw & Modifying commands.
- 2.10 Practice of Object Properties Color, Line type, Line weight.

- 2.11 Practice of view commands Zoom, Pan.
- 2.12 Practice of Drafting Settings.
- 2.13 Practice of Hatch, Gradient commands.
- 2.14 Practice of Block & insert commands.

3.0 Annotations:

- 3.1 Practice of Text, Text Justifications, Multi Line text, Text style, Scale text, Spell.
- 3.2 Practice on Leader, Multi Leader and Leader settings.
- 3.3 Practices on Table.
- 3.3 Practice On Dimensioning, DimLinear, Dimradius, DimAligned, DimDiameter, Dimcenter, Dim Angular, DimBaseline, Dimcontinue, Dimordinate, Dimensional settings.
- 3.4 Utilities, Distance, Radius, Angle, Area, volume.
- 3.5 Layer properties, make object Layer current, Match, previous, Isolate and Un-Isolate, Freeze, Off, turn all layers on, thaw all layers, Lock, Unlock, Change to current Layer, Copy objects to new Layer, Layer Walk, Isolate to current View port, Merge, Delete, Locked Layer fading.
- 3.6 Practice Plans using Layers.

4.0 Geometric constructions:

- 4.1 Practice on Point, DDP type, Divide, Measure.
- 4.2 Divide a given line into desired number of equal parts internally.
- 4.3 Draw tangent lines and arcs.
- 4.4 Construct a hexagon from the given data.
- 4.5 Construct ellipse, parabola, hyperbola, cycloid and helix.
- 4.6 Using CAD software draws & prints the following drawings.
- 4.7 Draw conventional signs as per I.S. Standards, Symbols used in civil engineering drawing.
- 4.8 Draw the important joinery components of the building like elevation of fully paneled double leaf door, elevation of partly glazed and partly paneled window.

5.0 Residential building:

- 5.1 Plan, Elevation, Section of single roomed building.
- 5.2 Single storied bearing type residential building,
 - 5.2.1 One Bed Room House.
 - 5.2.2 Two Bed Room House.
- 5.3 Single storied framed structure type residential building,
 - 5.3.1 One Bed Room House.
 - 5.3.2 Two Bed Room House.

- 5.4 Drawing to be submitted for approval to corporate or municipality showing required details in one sheet such as,
- 5.4.1 Plan-Showing Dimensions of all rooms.
 - 5.4.2 Section-Showing specifications and Typical Foundation Details.
 - 5.4.3 Elevation.
 - 5.4.4 Site Plan- Showing Boundaries of site and plinth Area, car parking, passages and location of septic tank.
 - 5.4.5 Key plan- Showing the location of building.
 - 5.4.6 Title block- Showing Signature of owner & Licensed surveyor's.



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(16CE118) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Objectives:

- To learn the concepts of Venturimeter & Orifice meter
- To learn the concepts of notch's
- To learn the basic concepts of turbines
- To learn the basics concepts of different types of pumps.

Course Outcomes:

Students undergoing this course are able to

- Calibrate Venturimeter & Orifice meter
- Calculate losses in flows
- Estimate the efficiency of different pumps.
- Study the performance of different turbines.

LIST OF EXPERIMENTS:

***Cycle 1:**

1. Verification of Bernoulli's equation.
2. Calibration of Coefficient of discharge for Venturimeter.
3. Calibration of Coefficient of discharge for Orifice meter.
4. Calibration of Friction factor. (major losses experiment)
5. Determination of loss of head due to sudden contraction. (minor losses experiment)
6. Calibration of Discharge over Notches (Rectangular/Triangular Notch.)
7. Determination of Coefficient of discharge for a small orifice / mouthpiece by a constant head method / variable head method.

***Cycle 2:**

8. Impact of jet on vanes.
9. Performance test on Pelton wheel turbine.
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Study on Hydraulic jump.
13. Performance test on Kaplan turbine

***Minimum Four experiments** must be conducted in the lab from each cycle

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(COE-II) COMPREHENSIVE ONLINE EXAMINATION -II

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**(16HS614) COMPREHENSIVE SOFT-SKILLS
(AUDIT COURSE)
(Common to All Branches)**

Course Description:

Soft Skills is an intangible idea in which the qualities like attitude, ability, integrity, reliability, positivity, flexibility, dependability, punctuality, management, cooperation, habits and practices are combined proficiently to capitalize on a person's work efficacy. Soft Skills do the work of combining all these components in accurate share into skills and shaping them into competencies. Companies opt for, maintain and prop up persons, who are trustworthy, ingenious, principled and good communicators and who are prepared to work under stress. These lessons are developed with a view to create awareness of the importance of the soft skills and assist the learners to improve them.

Course Objectives:

The main objectives of this course are:

- To help the students understand interpersonal skills.
- To support them in building interpersonal skills.
- To enhance the ability to work with others.

Course Outcomes:

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different levels of Soft Skills to develop their personality.

UNIT I

Non verbal Communication – Body Cues – Smiling, Posture, Gesture, Eye-contact – Stage appearance – Interpersonal and Intrapersonal skill Telephonic Etiquette – Dos and Don'ts of Telephonic Conversation

UNIT II

Self exploration – Self Discovery – Self acceptance – Self esteem – Self confidence – Personal grooming – Attitudes – Confidence building. Interpersonal relationship in the present context – Kinds of relationships – Team building – Formation of team

UNIT III

Vision and Goal setting – Personal goal – Career goal – Types of Organization – Deep dive of company profiles – Win-win situation – Proactive skills – Entrepreneurial skills and model start-ups- Developing Mind skills – quizzes – General knowledge – Puzzles – Reading Comprehension - Spell Bee - Seminar – Who is who? – Biographies

UNIT IV

Flight Leadership: Assessing Leadership qualities – Experiential learning of leadership skills exercise in team work Time and Stress Management: Importance of Time Management – The art of prioritizing and scheduling – Stress and Source of Stress Types of Stress – Managing stress

UNIT V

Change: Coping skills – Critical and Adaptive Mindsets – Changes in Career/ Life/ people – Just A Minute – Mock GDs and Mock Interviews

REFERENCES:

1. *Business Communication*, Aruna Koneru
2. *Effective Tech Communication*, Rizvi, Tata McGraw – Hill Education, 2007.
3. *Reading Extra*, Liz Driscoll, Cambridge University Press, 2004.
4. *Speak Well*, Jayashree Mohanraj et al, Orient Blackswan, 2013.