

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

I B. Tech. – I Semester (Ag. Engg.)

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 and 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 (Ag. Engg.)

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 (Ag. Engg.)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS612	Engineering Mathematics-III	3	1	-	3
2.	16AG701	Engineering Properties of Biological Materials	3	1	-	3
3.	16CE104	Strength of Materials	3	1	-	3
4.	16CE112	Fluid Mechanics & Hydraulic Machinery	3	1	-	3
5.	16EE207	Basic Electrical & Electronics Engineering	3	1	-	3
6.	16CE155	Soil Science & Soil Mechanics	3	-	-	3
7.	16CE158	Strength of Materials / Soil Mechanics Lab	-	-	4	2
8.	16CE116	Fluid Mechanics & Hydraulic Machinery 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	5	8	23
			Total/Week 34			

II B. Tech. – II Semester (Ag. Engg.)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS613	Probability & Statistics	3	1	-	3
2.	16AG702	Principles of Agronomy and Soil Science	3	1	-	3
3.	16CE156	Hydrology	3	1	-	3
4.	16CE105	Surveying	3	1	-	3
5.	16ME344	Theory of Machines	3	1	-	3
6.	16ME345	Tractor and Automotive Engines	3	1	-	3
7.	16CE157	Surveying Lab	-	-	4	2
8.	16AG703	Agronomy and Soil Science Lab	-	-	4	2
Credit Course						
9.	COE-II	Comprehensive Online Examination-II	-	-	-	1
Audit Course						
10.	16HS614	Comprehensive Soft Skills	3	-	-	-
Contact Periods / Week			21	6	8	22
			Total/Week 35			

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

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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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. *Mindsapes: 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

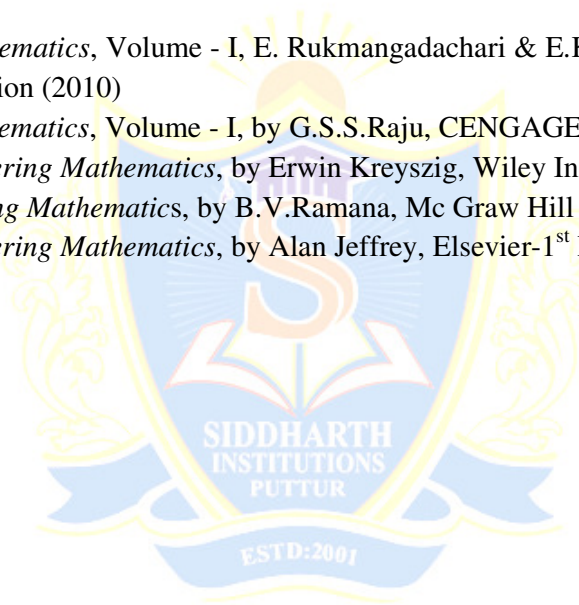
LAPLACE TRANSFORM II: Inverse Laplace Transforms, Convolution theorem, Application of Laplace transforms to ordinary differential equations of first and second order.

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 AG, 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

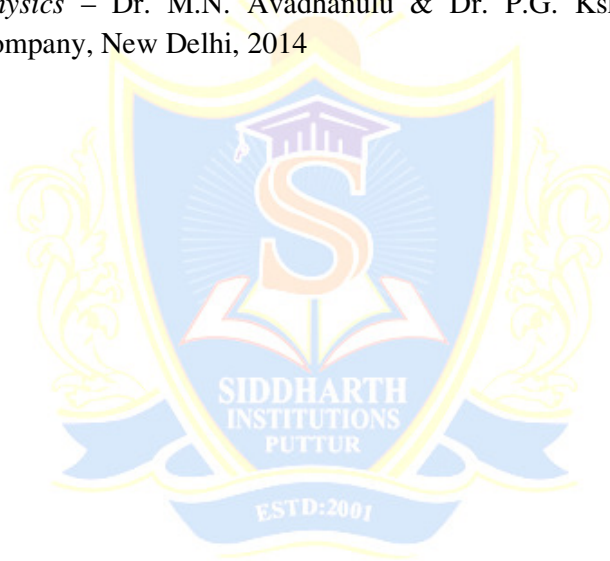
superconductors- ac and dc Josephson effects BCS theory (qualitative) –Applications of superconductors. Physics of Nanomaterials: Introduction - Significance of nanoscale - Surface area and quantum confinement –Synthesis of nanomaterials: ball mill, chemical vapour deposition, sol-gel, plasma arcing –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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**(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 AG, 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

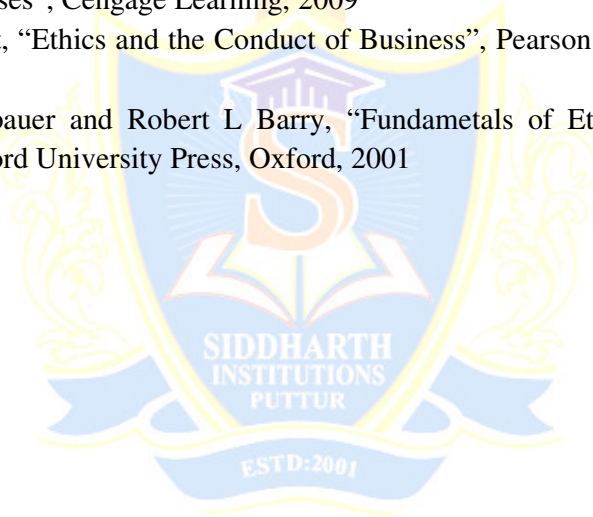
Global Issues-Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

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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(16HS608) ENGINEERING PHYSICS LABORATORY
(Common to AG, 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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I B. Tech. – I Sem. (Ag. Engg.)

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**(16ME301) ENGINEERING & IT WORK SHOP LAB
(Common to AG, 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)

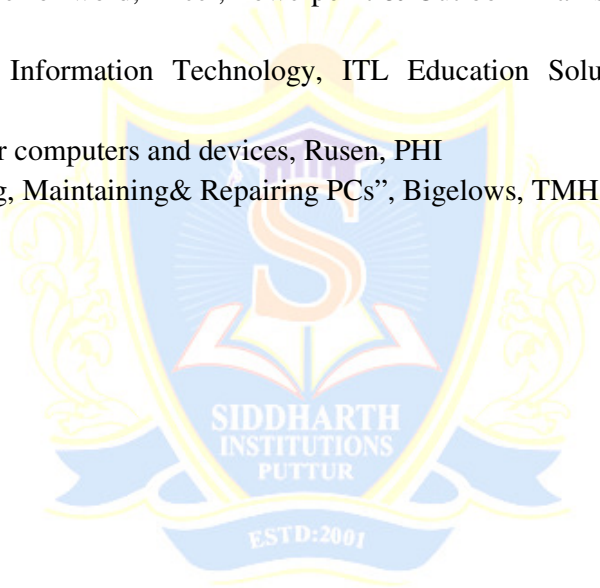
8.1 Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images 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



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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. *Mindsapes: 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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**(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

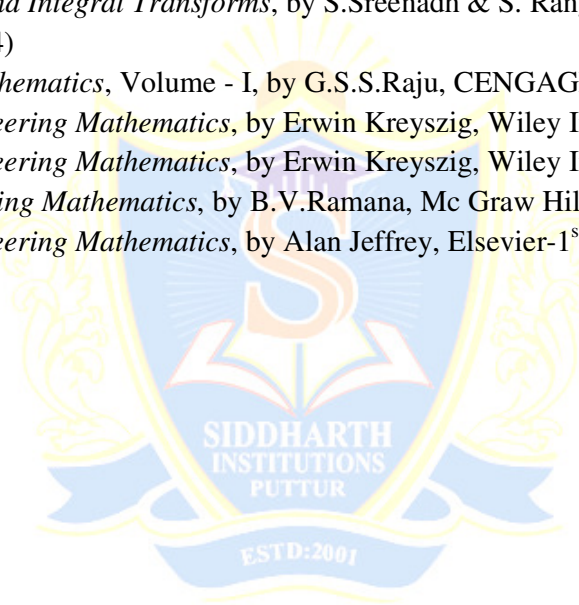
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Method of separation of variables, Solution of one dimensional wave equation, Heat equation and two dimensional Laplace equation under initial and boundary conditions.

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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**(16HS604) ENGINEERING CHEMISTRY
(Common to AG, 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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**(16ME302) ENGINEERING GRAPHICS
(Common to AG, 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.

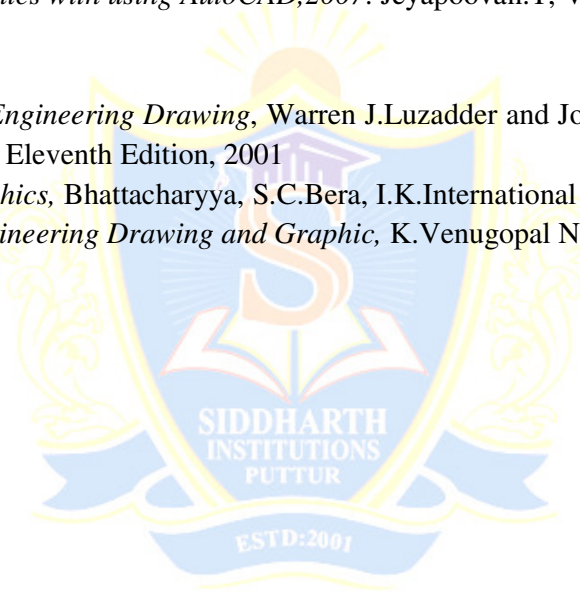
COMPUTER AIDED DRAFTING: Introduction to drafting packages - orthographic views and projections and Isometric projections (demonstration only)

TEXT BOOKS:

1. *Engineering Drawing*, N.D.Bhatt, Charotar Publishers
2. *A text Book of Engineering Drawing*, K.L.Narayana, Kannaiah, Scitech Publishers, 2010
3. *Engineering Graphics with using AutoCAD,2007*. Jeyapoovan.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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**(16CE101) ENGINEERING MECHANICS
(Common to AG, 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.



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	4	2

**(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
(Common to AG, 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.

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**(16HS609) ENGINEERING CHEMISTRY LAB
(Common to AG, 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
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I B. Tech. – II Sem. (Ag. Engg.)	P	C
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(16CE102) APPLIED MECHANICS LAB		
(Common to AG, 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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II B.Tech. - I Sem. (Ag. Engg.)

L	T	C
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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

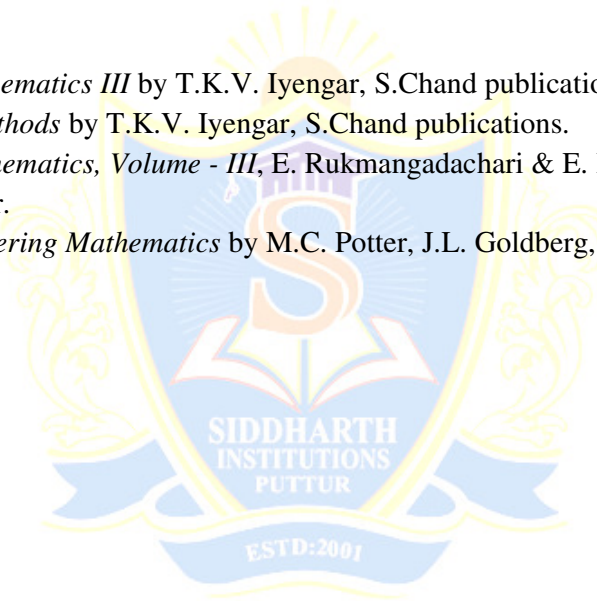
NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor's series, Picard's Method of successive Approximations, Euler's Method, Runge-Kutta second and fourth order methods.

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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II B.Tech. - I Sem. (Ag. Engg.)

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(16AG701) ENGINEERING PROPERTIES OF BIOLOGICAL MATERIALS

Course Objectives:

- At the end of the course student attains adequate knowledge about different properties of biological materials
- At the end of the course should be able to recognize the importance of the properties in design of the equipment, process, handling and storage.

Course Outcomes:

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

- Measure the physical, thermal, optical and rheological properties of the biological materials
- Use the properties data in design of the equipment and process.

UNIT - I

Classification and importance of engineering properties of Agricultural Produce, shape, size, roundness, sphericity, volume, density, porosity, specific gravity, surface area of grains, fruits and vegetables,

UNIT - II

Thermal properties, Heat capacity, Specific heat, Thermal conductivity, Thermal diffusivity, Heat of respiration; Co-efficient of thermal expansion,

UNIT - III

Friction in agricultural materials; Static friction, Kinetic friction, rolling resistance, angle of internal friction, angle of repose, Flow of bulk granular materials, Aero dynamics of agricultural products, drag coefficients, terminal velocity.

UNIT - IV

Rheological properties; force, deformation, stress, strain, elastic, plastic and viscous behaviour, Newtonian and Non-Newtonian liquid, Visco-elasticity, Newtonian and Non-Newtonian fluid, Pseudo-plastic, Dilatant, Thixotropic, Rheopectic and Bingham Plastic Foods, Flow curves.

UNIT - V

Electrical properties; dielectric loss factor, loss tangent, A.C. conductivity and dielectric constant, method of determination. Application of engineering properties in handling processing machines and storage structures

TEXT BOOKS:

1. Mohesin, N.N. 1980. Physical Properties of Plants & Animals. Gordon & Breach Science Publishers, New York.
2. Mohesin, N.N. 1980. Thermal Properties of Foods and Agricultural Materials. Gordon & Breach Science Publishers, New York.
3. Prentice, J.H. 1984. Measurement in Rheological Properties of Food Stuffs. Elsevier Applied Science Pub. Co. Inc. New York.

REFERENCES:

1. Singhal OP & Samuel DVK. 2003. Engineering Properties of Biological Materials. SarojPrakashan.
2. Rao, M.A. and Rizvi, S.H., 1995. Engineering Properties of Foods. Marcel Dekker Inc. New York.



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II B.Tech. - I Sem. (Ag. Engg.)

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**(16CE104) STRENGTH OF MATERIALS
(Common to ME & AG)**

Course Educational 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 – Working stress – Factor of safety – Lateral strain, 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 – Types of beams – Shear force and bending moment diagrams for simply supported - Cantilever and over hanging beams with point loads, uniformly distributed load, uniformly varying loads and couples – Relationship between shear force and bending moment.

UNIT - III

THEORY OF SIMPLE BENDING: Assumptions made 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-Tangle 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: Bending into a circular arc – Slope - deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads - Uniformly distributed load, uniformly varying load.

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.

UNIT - V

THIN CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in diameter and volume of thin cylinders – Riveted boiler Shells - Thin spherical shells.

THICK CYLINDERS: Thick cylinders – Lamé's equation – Design of thick cylindrical shells – Compound cylinders – Shrink fit allowance – Initial difference of radii at the junction.

TEXT BOOKS:

1. *Strength of Materials (Mechanics of Solids)*, 6th Edition, Er. R.K. Rajput, S. Chand Publishing, 2015.
2. *A Textbook of Strength of Materials*, 6th Edition, Dr. R. K. Bansal, Laxmi Publications, 2016.

REFERENCES:

1. *Mechanics of Materials*, Revised, 2016 Edition, Dr. B. C. Punmia, Er. Ashok Kr. Jain, Dr. Arun Kumar Jain, Laxmi Publications, 2016.
2. *Strength of Materials*, 3rd Edition, R. Subramanian, Oxford University Press, 2010.
3. *Strength of Materials*, 24th Edition, R. S. Khurmi, S. Chand Publishing, 2015.
4. *Strength of Materials*, 11th Edition, Sadhu Singh, Khanna Publishers, 2013.

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II B.Tech. - I Sem. (Ag. Engg.)

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(16CE112) FLUID MECHANICS & HYDRAULIC MACHINERY

Course Educational 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.*
- *To understand the working principles of hydraulic machinery.*

Course Outcomes:

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

- *How to find frictional losses in a pipe when there is a flow between two places.*
- *Know types of flow and its measurements and applications.*
- *Identify the suitable pump required for different purposes.*
- *Classify the turbines and design criteria based on water availability.*

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: Reynold's experiment – Reynold's number - Minor losses in pipe flow - Darcy-Weisbach equation – Variation of friction Factor – Moody's chart – Pipes in series – Pipes in parallel, Boundary Layer Theory.

Flow Measurement: Velocity measurement by Pitot tube and Pitot static tube – Discharge measurement by Venturimeter and orifice meter – Orifices and mouthpieces

UNIT IV

Dimensional Analysis and Similitude: Introduction, dimensions; dimensional homogeneity; Methods of dimensional analysis- Rayleigh's method; Buckingham - Pi theorem. Similitude - Types of Similarities. Model Laws.

UNIT V

HYDRAULIC TURBINES: Elements of hydroelectric power plants- Heads and efficiencies of turbines – Classification of turbines –Pelton Wheel-Modern Francis turbine – Kaplan turbine. Main components and working principle- Expressions for work done and efficiency – Working proportions and design of each.

CENTRIFUGAL PUMPS: Classification and types of pumps – Components and working of a centrifugal pump – Work done by the impeller– Heads and efficiencies – Net positive suction head(NPSH)- Priming – Priming devices – Minimum starting speed – Multistage pumps – Pumps in series and parallel – Submersible pumps – Limiting suction head – Cavitation – Expression for specific speed.

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, 2015.
2. *A Textbook of Fluid Mechanics and Hydraulic Machines*, 9th Edition, Dr. R. K. Bansal, Laxmi Publications, 2016.

REFERENCES:

1. *Fluid Mechanics*, 9th Edition, Victor Streeter, E. Benjamin Wylie, K.W. Bedford, McGraw Hill Education, 2010.
2. *Fluid Mechanics and Machinery*, 1st Edition, C.S.P. Ojha, P.N. Chandamouli & R. Berndtsson, Oxford University Press, 2010.
3. *Fluid Mechanics and Hydraulic Machines*, 1st Edition, S. C. Gupta, Pearson India Education Services Pvt. Ltd, 2006.
4. *Fluid Mechanics and Machinery*, 1st Edition, Rama Durgaiah D., New Age International, 2002.

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II B.Tech. - I Sem. (Ag. Engg.)

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**(16EE207) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
PART – A
BASIC ELECTRICAL ENGINEERING**

Course Objectives:

- *Basic Electrical Engineering contains basic Electrical Laws, Network theorems, AC & DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.*

Course Outcomes:

- *After going through this course, the student gets a thorough knowledge on basics of Network theorems, two port networks, DC Motors and Transformers with which he/she can able to apply the above conceptual things to real-world problems and applications.*

UNIT – I

INTRODUCTION TO ELECTRICAL ENGINEERING

Ohm's Law, Basic Circuit Components, Kirchhoff's Laws, Types of Sources, Resistive Networks, Inductive Networks, Capacitive Networks, Series Parallel Circuits, Star Delta and Delta Star Transformation. Principle of AC Voltages, Root Mean Square and Average Values of Alternating Currents and Voltage, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities.

UNIT- II

NETWORK THEOREMS & TWO PORT NETWORKS

Network Theorems: Thevenin's, Norton's, Maximum Power Transfer, Reciprocity and Superposition Theorems for DC Excitations

Two Port Networks: Two Port Network Parameters – Impedance, Admittance, Transmission and Hybrid Parameters and Their Relations.

UNIT-III

DC MOTORS and TRANSFORMERS

DC Motors: Principle of Operation of DC Motors, Types of DC Motors, Torque Equation, Losses and Efficiency Calculation in DC Motor- Swinburne's Test and Applications.

Transformers: Principles of Operation, EMF equation, Losses and Efficiency, Regulation of Transformer, Testing: OC & SC Tests.

PART-B

UNIT I

Semiconductor Devices: Intrinsic Semiconductors-Electron-Hole Pair Generation, Conduction in Intrinsic Semiconductors, Extrinsic Semiconductors-N-Type and P-Type Semiconductors, Comparison of N-Type and P-Type Semiconductors. The p-n Junction –

Drift and Diffusion Currents, The p-n Junction Diode-Forward Bias, Reverse Bias, Volt-Ampere Characteristics- Diode Specifications, Applications of Diode, Diode as a Switch. Diode as a Rectifier-Half-Wave Rectifier, Full-Wave Rectifier, Full-Wave Bridge Rectifier, Rectifiers with Filters, Zener Diode- Volt-Ampere Characteristics, Zener Diode as Voltage Regulator.

UNIT II

BJT and FETs: Bipolar Junction Transistor (BJT) – Types of Transistors, Operation of NPN and PNP Transistors, Input-Output Characteristics of BJT-CB, CE and CC Configurations, Relation between I_C , I_B and I_E Transistor Biasing- Fixed Bias, Voltage Divider Bias, Transistor Applications- Transistor as an Amplifier, Transistor as a Switch, Junction Field Effect Transistor (JFET)- Theory and Operation of JFET, Output Characteristics, Transfer Characteristics, Configurations of JFET-CD, CS and CG Configurations, JFET Applications- JFET as an Amplifier, JFET as a Switch, Comparison of BJT and JFET, MOSFET-The Enhancement and Depletion MOSFET, Static Characteristics of MOSFET, Applications of MOSFET.

UNIT III

Oscillators and Op-Amps: Sinusoidal Oscillators, Barkhausen Criteria for Oscillator Operation, Components of an Oscillator-Transistor Amplifier Circuits, Feedback Circuits and Oscillator Circuits, Classification of Oscillators, LC Tuned, RC Phase Shift Oscillator circuits.

Operational Amplifiers(Op-Amps)-Symbol of an Op-Amp, single Input and Dual Input Op-Amps (Differential Amplifier), Characteristics of an Ideal Op-Amp, Basic Forms of Op-Amps-Inverting & Non-Inverting Amplifiers, Applications of Op-Amps, summing, Differential, Integrator, differentiator Amplifier.

TEXT BOOKS:

1. ” *Basic Electrical Engineering*“, M.S. Naidu and S. Kamakshiah – TMH.
2. “*Basic Electrical Engineering*“, T.K. Nagasarkar and M.S. Sukhija Oxford University Press.
3. *Basic Electrical and Electronics Engineering*, M.S. Sukhija, T.K. Nagsarkar, Oxford University, Press, 1st Edition, 2012.
4. *Basic Electrical and Electronics Engineering*, S.K Bhattacharya, Pearson Education, 2012

REFERENCES:

1. “*Theory and Problems of Basic Electrical Engineering*“, D.P. Kothari& I.J. Nagrath PHI, 2011.
2. “*Principles of Electrical Engineering*”, V. K Mehta, S. Chand Publications, 2015.
3. “*Fundamentals of Electrical Electronics Engineering*”, T. Thyagarajan, SCITECH Publications 5th Edition-2007.
4. *Electrical and Electronic Technology*-By Hughes – Pearson Education, 10th Edition, 2008.

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II B.Tech. - I Sem. (Ag. Engg.)

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(16CE155) SOIL SCIENCE & SOIL MECHANICS

Course Objectives:

- To expose the students to the fundamental knowledge on Soil physical parameters, Permeability – Compaction, Bearing Capacity and types and methods of soil survey and interpretative groupings.

Course Outcomes:

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

- Fundamental knowledge of soil physical parameters.
- The procedures involved in soil survey, soil classification.
- The phase relationship and soil compaction.
- Concepts of bearing capacity and slope stability.

**PART A
SOIL SCIENCE**

UNIT I

Soil genesis and classification: Weathering - formation and composition of soil - classification of soils.

Soil colloids: Inorganic and organic colloids, their nature and physico-chemical properties - ion exchange phenomena, and nutrient availability.

Mineral nutrition of plants: Essential elements - Chemical fertilizers - Organic manures.

UNIT II

Physics of soil: Texture, structure and basic physical properties, retention and movement of soil water, permeability and ground water flow, gaseous exchange, soil strength and thermal properties of soil.

Soil tillage: Types of tillage and their influence on soil physical properties and crop performance.

Soil management: Management of acid, saline, sodic, highly and slowly permeable soils, water quality

PART B: SOIL MECHANICS

UNIT - III

Three phase system of soil – Basic definitions – Determination of index properties – Clay mineralogy - Atterberg Limits – Sieve analysis & particle size distribution – Indian standard classification

UNIT - IV

Permeability & Seepage: Soil Water – Permeability – Darcy's law - Factors affecting permeability – Laboratory & field methods of determining coefficient of permeability – Effective stress – Quick sand – Flow nets

Vertical Stress Distribution: Geostatic stress - Boussinesq's equation – Westergaard equation – Pressure bulb – Newmark's chart

UNIT - V

Compaction: Definition – Proctor's compaction test – Compaction curve – Field control of compaction

Consolidation: Definition - Terzaghi's one dimensional consolidation theory

Shear Strength: Mohr-Coulomb failure theory - Measurement of shear strength: Direct Shear, UCC, Triaxial Shear & Vane Shear Test.

TEXT BOOKS

1. Nyle C. Brady, "*The Nature and Properties of Soil*", Macmillan Publishing Company, 10th Edition, New York, 2008.
2. Punmia, B.C., "*Soil Mechanics and Foundation*" Laxmi Publishers, New Delhi. 2007.

REFERENCES:

1. Edward J. Plaster., "*Soil Science*", Cengage Learning India Ltd, New Delhi, 2009.
2. Arora, K.R. "*Soil Mechanics and Foundation Engineering*", Standard Publishers and Distributors, New Delhi, 2007.
3. Murthy, V.N.S. "*Soil Mechanics and Foundation Engineering*", UBS Publishers and Distributors, New Delhi, 2007.
4. Sehgal, S.B., "*Text Book of Soil Mechanics*", CBS Publishers and Distributors New Delhi, 2007.

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II B. Tech. – I Sem. (Ag. Engg.) **P C**
4 2

(16CE158) STRENGTH OF MATERIALS / SOIL MECHANICS 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.
- Experiments to find Types of Metals, Steels, Cast irons and their Microstructures; Heat Treatment procedures; Data acquisition and recording; Grain size analysis; Phase segmentation.
- Analyze the microstructure and estimate the amount of porosity and grain size of the casted specimen.
- Apply the knowledge of phase diagrams and testing methods to suit design specification in related areas.

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.
6. Torsion test on mild steel rod.
7. Hardness test on metals (Rockwell and Brinell Hardness Number Tests).
8. Continuous beam-deflection test

SOIL MECHANICS LAB

1. Special gravity of soil solids
2. Grain size distribution
3. Atterberg Limits
4. Field density Test (Sand replacement method)

5. Permeability determination (constant head and falling head methods)
6. Direct shear test in cohesion-less soil
7. Unconfined compression test in cohesive soil
8. California Bearing Ratio Test

***Minimum Five experiments** must be conducted in the lab from each lab



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(16CE116) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

Course Educational 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-I) COMPREHENSIVE ONLINE EXAMINATION -I

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**(16CS503) DATA STRUCTURES THROUGH C
(AUDIT COURSE)**

(Common to AG, 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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II B.Tech. - II Sem. (Ag. Engg.)	L	T	C
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**(16HS613) PROBABILITY & STATISTICS
(Common to AG, 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

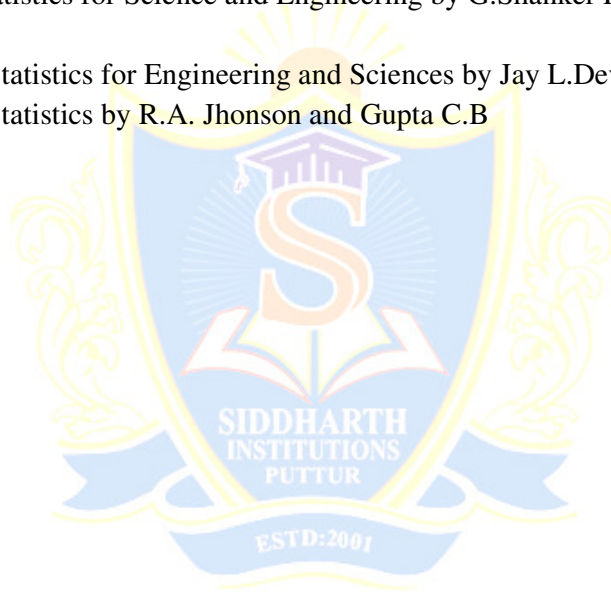
Statistical Quality Control: Concept of quality of a manufactured product, Defects and Defectives, Causes of variations, Random and assignable, The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics, Constructions and operation of X- bar Chart, R-Chart, P-Chart 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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(16AG702) PRINCIPLES OF AGRONOMY AND SOIL SCIENCE

Course Objectives:

- At the end of the course student attains adequate knowledge in crop production.
- At the end of the course student attains adequate knowledge in assessing both Physical and Engineering behavior of soils through laboratory testing procedures.

Course Outcomes:

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

- Different crops and cropping techniques
- Know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.

UNIT – I

Agronomy

Introduction and scope of agronomy. Classification of crops, Effect of different weather parameters on crop growth and development. Principles of tillage, tilling and its characteristics. Crop seasons. Methods, time and depth of sowing of major field crops. Methods and time of application of manures and fertilizers. Organic farming- Sustainable agriculture.

UNIT - II

Soil water plant relationship, crop coefficients, water requirement of crops and critical stages for irrigation, weeds and their control, crop rotation, cropping systems, Relay cropping and mixed cropping.

UNIT - III

Soil science

Nature and origin of soil; soil forming rocks and minerals, their classification and composition, soil forming processes, classification of soils – soil taxonomy orders; important soil physical properties; and their importance; soil particle distribution;

UNIT - IV

soil inorganic colloids – their composition, properties and origin of charge; ion exchange in soil and nutrient availability; soil organic matter – its composition and decomposition, effect on soil fertility; soil reaction – acidic, saline and sodic soils;

UNIT - V

Quality or irrigation water; essential plants nutrients – their functions and deficiency symptoms in plants; important inorganic fertilizers and their reactions in soils. Use of saline

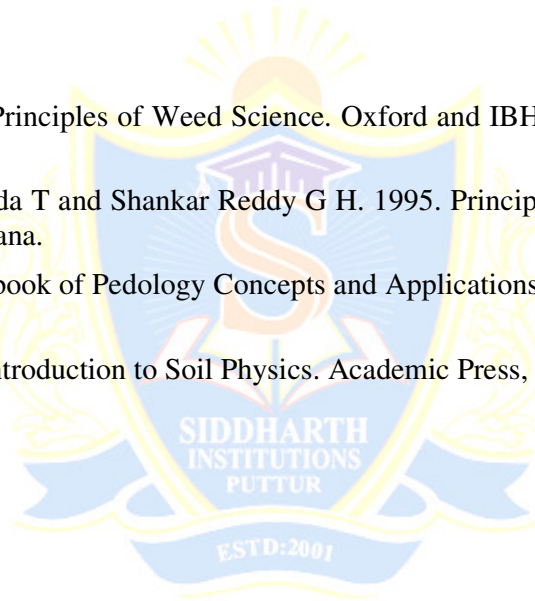
and sodic water for crop production, Gypsum requirement for reclamation of sodic soils and neutralising RSC; Liquid fertilisers and their solubility and compatibility.

TEXT BOOKS:

1. William L Donn. 1965. Meteorology. McGraw-Hill Book Co. New York.
2. Arnon L. 1972. Crop Production in Dry Regions. Leonard Hill Publishing Co. London.
3. Yawalkar K S and Agarwal J P. 1977. Manures and Fertilizers. Agricultural Horticultural Publishing House, Nagpur.
4. Gupta O P. 1984. Scientific Weed Management in the Tropics and Sub- Tropics. Today and Tomorrow's Printers and Publishers. New Delhi.
5. Brady Nyle C and Ray R Well. 2002. Nature and properties of soils. Pearson Education Inc., New Delhi.
6. Indian Society of Soil Science. 1998. Fundamentals of Soil Science. IARI, New Delhi.

REFERENCES:

1. Rao V S. 1992. Principles of Weed Science. Oxford and IBH Publishing Co. Ltd. New Delhi.
2. Reddy Yellamanda T and Shankar Reddy G H. 1995. Principles of Agronomy. Kalyani Publishers Ludhiana.
3. SehgalJ. A. Textbook of Pedology Concepts and Applications. Kalyani Publishers, New Delhi.
4. Hillel D. 1982. Introduction to Soil Physics. Academic Press, London.



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(16CE156) HYDROLOGY

Course Outcomes:

- To introduce the student to the concept of hydrological aspects of water availability and requirements and should be able to quantify, control and regulate the water resources

Course Outcomes:

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

- an understanding of the key drivers on water resources, hydrological processes and their integrated behavior in catchments,
- ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge
- ability to conduct Spatial analysis of rainfall data and design water storage reservoirs

UNIT I

PRECIPITATION AND ABSTRACTIONS: Hydrological cycle- Meteorological measurements – Requirements, types and forms of precipitation - Rain Gauges-Spatial analysis of rainfall data using Thiessen and Isohyetal methods Interception - Evaporation. Horton's equation, pan evaporation measurements and evaporation suppression - Infiltration- Horton's equation - double ring infiltrometer, infiltration indices.

UNIT II

RUNOFF: Watershed, catchment and basin - Catchment characteristics - factors affecting runoff - Run off estimation using empirical – Strange's table and SCS methods – Stage discharge relationships- flow measurements- Hydrograph – Unit Hydrograph – IUH

UNIT III

FLOOD AND DROUGHT: Natural Disasters-Flood Estimation- Frequency analysis- Flood control- Definitions of droughts Meteorological, hydrological and agricultural droughts- IMD method-NDVI analysis- Drought Prone Area Programme (DPAP)

UNIT IV

RESERVOIRS: Classification of reservoirs, General principles of design, site selection, spillways, elevation – area - capacity - storage estimation, sedimentation - life of reservoirs – rule curve

UNIT V

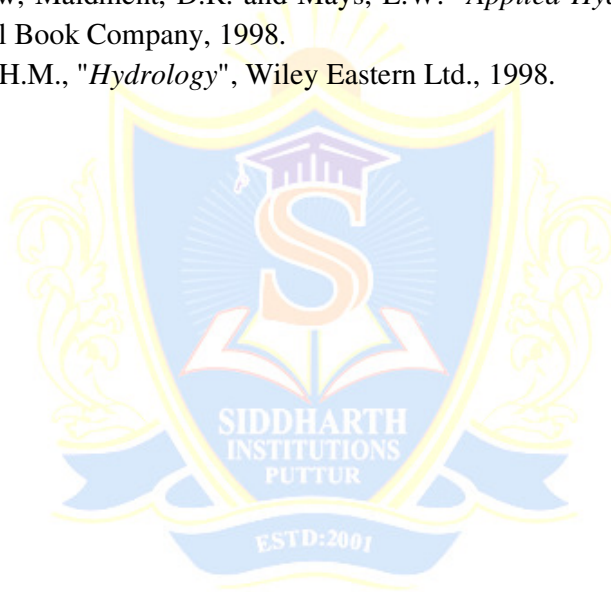
GROUNDWATER AND MANAGEMENT: Origin- Classification and types - properties of aquifers- governing equations – steady and unsteady flow - artificial recharge - RWH in rural and urban areas

TEXTBOOKS:

1. Subramanya.K. "*Engineering Hydrology*"- Tata McGraw Hill, 2010
2. JayaramiReddy.P. "*Hydrology*", Tata McGraw Hill, 2008.
3. Linsley, R.K. and Franzini, J.B. "*Water Resources Engineering*", McGraw Hill International Book Company, 1995.

REFERENCES:

1. David Keith Todd. "*Groundwater Hydrology*", John Wiley & Sons, Inc. 2007
2. VenTe Chow, Maidment, D.R. and Mays, L.W. "*Applied Hydrology*", McGraw Hill International Book Company, 1998.
3. Raghunath. H.M., "*Hydrology*", Wiley Eastern Ltd., 1998.



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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 harbors
- 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 and 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: Definition, 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.

REFERENCE BOOKS:

1. *Surveying and levelling part I & II*, 23rd Edition, Kanetkar.T.P. & S.V. Kulkarni, PunaVidyarthiGirha, 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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(16ME344) THEORY OF MACHINES

Course Educational Objectives:

- *To understand the basic concepts of mechanisms, cam, gear train and their kinematics.*
- *To understand the effects of friction in the motion of machine components.*

Course Outcomes:

Students undergoing this course are able to

- *Familiarity with common mechanisms used in machines and everyday life.*
- *Identify different mechanisms, Inversions of kinematic chains*
- *Ability to perform analysis of different types of links, position, velocity, acceleration analyses.*

UNIT I

BASICS OF MECHANISMS: Elements, links, pairs, kinematics chain, and mechanisms. Classification of pairs and mechanisms. Lower and higher pairs. Four bar chains, slider crank chain and their inversions. Determination of velocity and acceleration using graphical (relative velocity and acceleration) method. Instantaneous centers.

UNIT II

GEARS: Types of gears. Law of gearing, velocity of sliding between two teeth in mesh. Involute and cycloidal profile for gear teeth. Spur gear, nomenclature, interference and undercutting. Introduction to helical, spiral, bevel and worm gear.

UNIT III

GEARS TRAINS: Simple, compound, reverted, and epicyclic trains. Determining velocity ratio by tabular method. Turning moment diagrams, co-efficient of fluctuation of speed and energy, weight of flywheel, flywheel applications.

UNIT IV

POWER TRANSMISSION SYSTEM: Belt drives, types of drives, belt materials. Length of belt, power transmitted, velocity ratio, belt size for flat and V belts. Effect of centrifugal tension, creep and slip on power transmission, Chain drives.

FRICTION: Types of friction, laws of dry friction. Friction of pivots and collars. Single disc, multiple disc, and cone clutches. Rolling friction, anti-friction bearings.

UNIT V

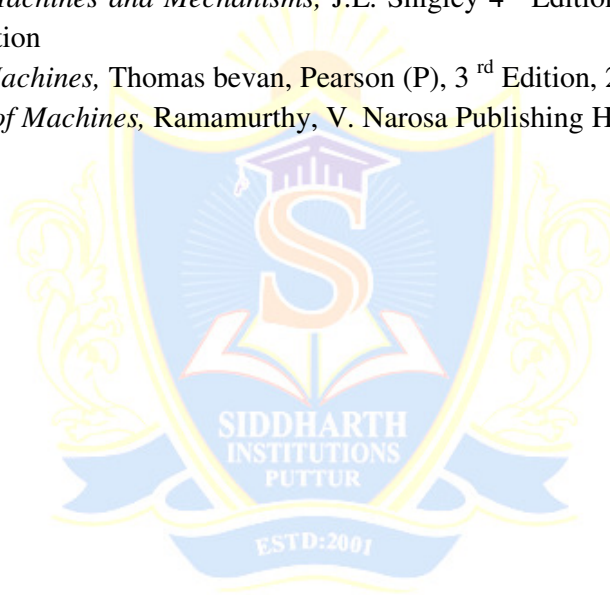
GOVERNORS: Types of governors. constructional details and analysis of Watt, Porter, Proell governors. Effect of friction, controlling force curves. Sensitiveness, stability, hunting, isochronism, power and effort of a governor. Static and dynamic balancing. Balancing of rotating masses in one and different planes. Partial primary balancing of reciprocating masses.

TEXT BOOKS:

1. *Theory of Machine*, S.S. Rattan, Tata McGraw-Hill, 3rd Edition, 2013.
2. *Theory of Machine*, R.S Khurmi, S Chand Publications, 14th Edition, 2005.
3. *Kinematics and dynamics of machinery*, R.L. Norton, Tata McGraw-Hill, 1st Edition, 2013.

REFERENCES:

1. *Theory of Machines and Mechanisms*, J.E. Shigley 4th Edition” Oxford International Student Edition
2. *Theory of Machines*, Thomas bevan, Pearson (P), 3rd Edition, 2012
3. *Mechanics of Machines*, Ramamurthy, V. Narosa Publishing House, 2002.



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(16ME345) TRACTOR AND AUTOMOTIVE ENGINES

Course Objective:

- The objective of this subject is to impart the knowledge of tractor engine components, working principles of IC engines, auxiliary systems, the combustion aspects of SI and CI engines in addition to the methods of improving performance.
- The students shall become aware on the latest developments in the field of IC engines like MPFI, CRDI etc. The student also shall apply the thermodynamic concepts in IC engines.

Course Outcomes:

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

- Know the working principles of IC engines, auxiliary systems, the combustion aspects of SI and CI engines in addition to the methods of improving performance.
- Know the thermodynamic concepts in IC engines.

UNIT I

Sources of farm power: Farm mechanization, Introduction of tractor, Classification of tractors, Various components of tractor, Thermodynamic System, State, Property, Process and Cycle, Laws of thermodynamics.

I.C. Engines: Definition of Engine and Heat Engine, I.C Engine Classification – Parts of I.C. Engines,

UNIT II

Working of I.C. Engines: Two Stroke & Four Stroke I.C. Engines SI & CI Engines, Valve and Port Timing Diagrams.

Gas Power Cycle: Carnot Cycle, Otto Cycle, Diesel Cycle, Dual Cycle, their applications, comparison of Otto, Diesel and Dual cycles

UNIT III

Fuel System: S.I. Engine: Fuel Supply Systems, carburetor types Air Filters, Mechanical and Electrical Fuel Pump – Filters– Gasoline Injection Systems.

Cooling & Lubrication System: Cooling Requirements, Air Cooling, Liquid Cooling, Thermo Siphon, Water and Forced Circulation System; Lubrication Systems-Flash, Pressurized and Mist Lubrication.

Ignition System: Function of An Ignition System, Battery coil Ignition System, Magneto Coil Ignition System, Electronic Ignition System using Contact Breaker, Electronic Ignition using Contact Triggers – Spark Advance and Retard Mechanism.

UNIT IV**Fuels and Combustion:**

S I engine: Normal Combustion and Abnormal Combustion – Importance of Flame Speed and Effect of Engine Variables – Type of Abnormal Combustion, Pre-Ignition and Knocking (Explanation) – Fuel Requirements and Fuel Rating, Anti Knock Additives, Combustion Chambers.

C.I. Engine: Stages of Combustion – Delay Period and Its Importance – Effect of Engine Variables – Diesel Knock– Combustion Chambers (DI And IDI), Fuel Requirements and Fuel Rating.

UNIT V

Testing and Performance of I.C. Engines: Measurement of Cylinder Pressure, Fuel Consumption, Air Intake, Exhaust Gas Composition, Brake Power – Determination of Frictional Losses and Indicated Power – Performance Test – Heat Balance Sheet and Chart.

Students are advised to refer the text book of “Internal Combustion Engine Fundamentals” by John B. Heywood.

TEXT BOOKS:

1. *Internal Combustion Engines / V. Ganesan- TMH, 4th Edition, 2012*
2. *Thermal Engineering / Rajput / Lakshmi Publications, 9th Edition, 2013*

REFERENCES:

1. *I.C. Engines fundamentals, Heywood, McGraw-Hill, 1st Edition, 2011*
2. *IC Engines – Mathur & Sharma – Dhanpath Rai & Sons, , 2010*
3. *Engineering fundamentals of IC Engines – Pulkrabek, Pearson, PHI, 2nd Edition, 2009*
4. *Thermal Engineering, Rudramoorthy – TMH, 10th Edition, 2010*
5. *Thermodynamics & Heat Engines, B. Yadav, Central publishing house., Allahabad, 2002*
6. *Thermal Engineering – R.S. Khurmi & J.K. Gupta – S. Chand, 15th Edition, 2012*

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((16CE157) SURVEYING LAB

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 theodolite methods.
- To train the students in plotting of contour maps by conducting leveling survey and total station and tachometric methods.
- 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:

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.
- 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. 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. Compound leveling (differential leveling).
7. An exercise of L.S. and C.S. and plotting.
8. Measurement of horizontal angles by method of repetition and reiteration.
9. Determination of height of building by trigonometric survey
10. Heights and distance using Principles of tachometric surveying
11. Determination of area using total station.
12. Traversing using total station.
13. Contouring using total station.
14. Determination of remote height using total station.

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(16AG703) AGRONOMY AND SOIL SCIENCE LAB

Course Objectives:

- At the end of the course student attains adequate knowledge in crop production.
- At the end of the course student attains adequate knowledge in assessing both Physical and Engineering behavior of soils through laboratory testing procedures.

Course Outcomes:

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

- Different crops and cropping techniques
- Know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.

List of Experiments:

Agromony

1. Identification of crops and their varieties, seeds, manures, fertilizers and weeds;
2. Fertilizer application methods;
3. Different weed control methods;
4. Practice of ploughing,
5. Practice of Puddling,
6. Practice of sowing.

Practical--soil science

1. Identification of rocks and minerals;
2. Examination of soil profile in the field;
3. Determination of organic carbon of soil;
4. Determination of Nitrogen,
5. Determination of Phosphorus and Potassium;
6. Identification of nutrient deficiency symptoms of crops in the field;
7. Determination of gypsum requirement of sodic soils;
8. Determination of water quality parameters.

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(COE-II) COMPREHENSIVE ONLINE EXAMINATION -II

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II B. Tech -II Sem. (Ag. Engg.)	L
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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.