

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

I B. Tech. – I Semester (ME)

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

I B. Tech. – II Semester (ME)

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 (ME)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS612	Engineering Mathematics-III	3	1	-	3
2.	16ME303	Material Sciences and Metallurgy	3	-	-	3
3.	16ME304	Kinematics of Machinery	3	1	-	3
4.	16ME305	Machine Drawing	-	-	6	3
5.	16CE104	Strength of Materials	3	1	-	3
6.	16CE112	Fluid Mechanics & Hydraulic Machinery	3	1	-	3
7.	16CE109	Strength of Materials 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			18	4	14	23
			Total/Week 36			

II B. Tech. – II Semester (ME)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS613	Probability & Statistics	3	1	-	3
2.	16EE207	Basic Electrical & Electronics Engineering	3	1	-	3
3.	16ME306	Manufacturing Technology	3	1	-	3
4.	16ME307	Engineering Thermodynamics	3	1	-	3
5.	16ME308	Dynamics of Machinery	3	1	-	3
6.	16ME309	Manufacturing Technology Lab	-	-	4	2
7.	16EE208	Basic Electrical & Electronics Engineering	-	-	4	2
8.	16ME310	Material Sciences and Metallurgy Lab	-	-	4	2
Credit Course						
9.	COE-II	Comprehensive Online Examination-II				1
Audit Course						
10.	16HS614	Comprehensive Soft Skills	3	-	-	-
Contact Periods / Week			18	5	12	22
			Total/Week 35			

III B. Tech. – I Semester (M.E)

S.No.	Course Code	Subject	L	T	P	C
1.	16ME311	Industrial Engineering & Management	3	1	-	3
2.	16ME312	Thermal Engineering	3	1	-	3
3.	16ME313	Non-Conventional Energy Resources	3	1	-	3
4.	16ME314	Design of Machine Elements-I	3	1	-	3
5.	16ME315	Automobile Engineering	3	1	-	3
6.	16ME316	Machine Tools	3	1	-	3
7.	16ME317	Thermal Engineering- Lab	-	-	4	2
8.	16ME318	Machine Tools Lab	-	-	4	2
Credit Course						
9.	COE-III	Comprehensive Online Examination-III	-	-	-	1
Audit Course						
10.	16HS616	Aptitude Practice-I	3	-	-	-
Contact Periods / Week			21	6	8	23
			Total/Week 35			

III B. Tech. – II Semester (M.E)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS605	Environmental Studies	3	-	-	3
2.	16MB750	Managerial Economics & Financial Analysis	3	-	-	3
3.	16ME319	Design of Machine Elements-II	3	1	-	3
4.	16ME320	Heat Transfer	3	1	-	3
5.	16ME321	CAD/CAM	3	1	-	3
6.	16HS615	Advanced English Language and Communication Skills Lab	-	-	4	2
7.	16ME322	Heat Transfer Lab	-	-	4	2
8.	16ME323	Computer Aided Design Lab	-	-	4	2
Credit Course						
9.	COE-IV	Comprehensive Online Examination-IV	-	-	-	1
Audit Course						
10.	16HS617	Aptitude Practice-II	3	-	-	-
Contact Periods / Week			18	3	12	22
			Total/Week 33			

IV B. Tech. I Semester (M.E)

S.No	Course Code	Subject	L	T	P	C
1.	16MB751	Entrepreneurship Development	3	1	-	3
2.	16ME324	Operations Research	3	1	-	3
3.	16ME325	Refrigeration & Air Conditioning	3	1	-	3
4.	16ME326	Metrology & Measurements	3	1	-	3
Department Elective – I						
5.	16ME327	Finite Element Methods	3	1	-	3
	16ME328	Quality Control and Reliability Engineering				
	16ME329	Metal Forming Process				
Open Elective						
6.	16CE145	Elements of Road Traffic Safety	3	-	-	3
	16EE239	Neural Networks & Fuzzy Logic				
	16EC443	Matlab Programming				
	16CS511	Database Management Systems				
	16MB752	Intellectual Property Rights				
7.	16ME330	Metrology and Measurements Lab	-	-	4	2
8.	16ME331	Computer Aided Engineering Lab	-	-	4	2
Contact Periods / Week			18	5	8	22
			Total/Week 31			

IV B.Tech. – II Semester (M.E)

S.No.	Course Code	Subject	L	T	P	C
1.	16ME332	Mechatronics	3	1	-	3
Department Elective – II						
2.	16ME333	Power Plant Engineering	3	-	-	3
	16ME334	Production and Operation Management				
	16ME335	Modern Manufacturing Methods				
Department Elective – III						
3	16ME336	Gas Turbine and Jet Propulsion	3	-	-	3
	16ME337	Automation & Robotics				
	16ME338	Advanced welding processes				
Department Elective – IV						
4.	MOOCS	MOOC courses-offered by SWAYAM/ NPTEL/ NISTE-suggested by the department(online courses)	3	-	-	3
5.	16ME339	Seminar	--	--	04	2
6.	16ME340	Project	--	--	20	10
Contact Periods / Week			12	1	24	24
			Total/Week 37			

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

Total credits: 178

Year	1 st year		2 nd year		3 rd year		4 th year		Total
Semester	I sem	II sem	I sem	II sem	I sem	II sem	I sem	II sem	
Credits	21	21	23	22	23	22	22	24	178

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

L	T	C
3	0	3

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

Course Objectives:

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

Course Outcomes:

Students will be able to

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

UNIT I

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

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

Grammar: Parts of speech-Kinds of sentences-Tenses

Vocabulary: Synonyms & Antonyms-Affixes – Phrasal verbs

Listening & Reading Activities

Writing: Paragraph writing-Note taking & Note making

Phonetics- Syllabification

UNIT II

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

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

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

UNIT III

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

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

UNIT IV

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

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

UNIT V

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

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

TEXT BOOKS:

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

REFERENCES:

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



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L	T	C
3	1	3

**(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

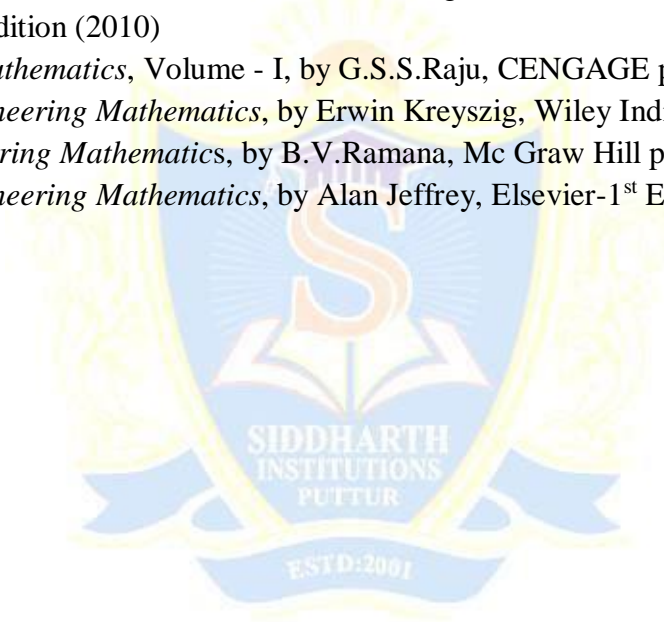
LAPLACE TRANSFORM II: Inverse Laplace Transforms, Convolution theorem, Application of Laplace transforms to ordinary differential equations of first and second order.

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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L	T	C
3	1	3

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

Course Objectives:

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

Course Outcomes:

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

UNIT I

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

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

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

UNIT II

CRYSTALLOGRAPHY, ACOUSTICS AND ULTRASONICS: Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravias 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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L	T	C
3	1	3

**(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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I B. Tech. – I Sem. (ME)

L	T	C
3	0	3

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

Course Objectives:

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

Course Outcomes:

Students undergoing this course are able to

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

.UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

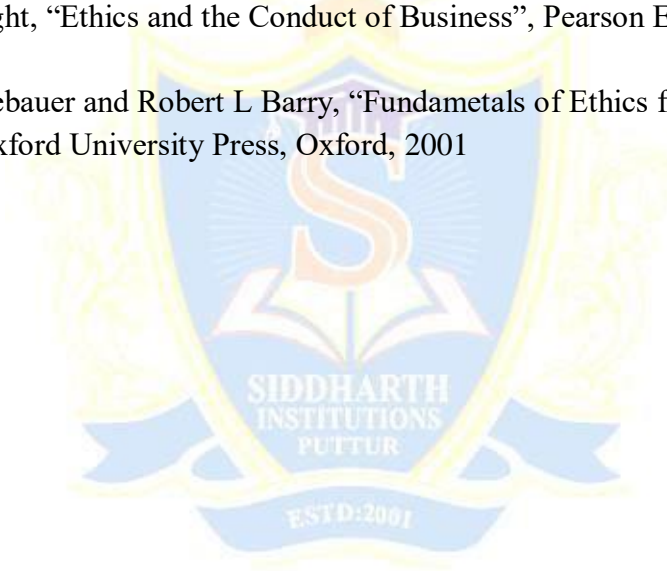
Global Issues-Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

TEXT BOOKS:

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

REFERENCES:

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



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I B. Tech. – I Sem. (ME)

P	C
4	2

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

Course Objectives:

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

Course Outcomes:

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

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

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

REFERENCES:

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



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**P C
4 2**

**(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.
- Identify, 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.

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

I B. Tech. – I Sem. (ME)

P	C
4	2

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

Course Educational Objectives:

ENGINEERING WORKSHOP

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

IT WORKSHOP

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

Course Outcomes:

ENGINEERING WORKSHOP

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

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

IT WORKSHOP

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

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

LIST OF EXPERIMENTS

1. TRADES FOR EXERCISES

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

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

2. TRADES FOR DEMONSTRATION:

a. Plumbing

b. Machine Shop

c. Metal Cutting

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

REFERENCES:

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

IT WORKSHOP

LIST OF EXPERIMENTS

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

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

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

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

6 Networking and Internet (4 weeks)

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

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

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

8. Productivity tools (6 weeks)

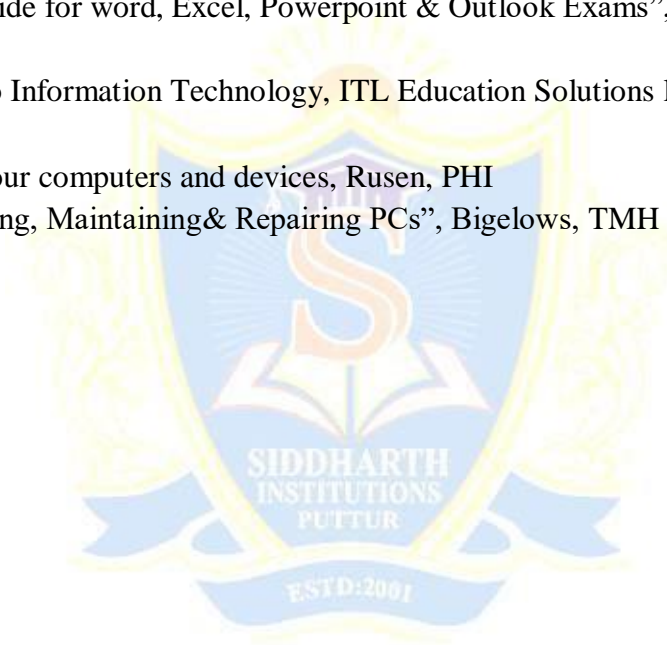
8.1 Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images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

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

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

REFERENCES:

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



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

I B. Tech. – II Sem. (ME)

L	T	C
3	0	3

**(16HS610) PROFESSIONAL ENGLISH
(Common to All Branches)**

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

Course Objectives:

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

Course Outcomes:

Students will be able to

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

UNIT I

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

1. Learning English Language through Literature (*Playing the English Gentleman*
M.K.Gandhi)

2. Oral presentation

3. Effective writing

Grammar: Relative clauses-Adjectives

Vocabulary: Sequencing words

Listening & Reading Activities

Writing: Analytical paragraph writing-Minutes of meeting

UNIT II

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

1. Learning English Language through Literature. (*The Portrait of a Lady* -Kushwant Singh)

2. Preparing and presenting slides, Telephone etiquette

3. Making drafts

Grammar: Adverbs - prepositions -cause and effect expressions

Vocabulary: phrasal verbs - Technical vocabulary-Extended definitions

Listening & Reading Activities

Writing: Report writing

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

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

2. Poster presentation, Debate

3. Technical drafting

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

Vocabulary: Acronyms & Abbreviations

Listening & Reading Activities

Writing: Writing projects

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

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

2. Group Discussion

3. Reading comprehension

Grammar: Structure indicating purpose-Subject-verb agreement

Vocabulary: emoticons-cloze test

Listening & Reading

Writing: Intensive and extensive

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

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

2. Interview etiquette

3. Job application

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

Vocabulary: verbal ability

Listening & Reading Activities

Writing: Covering letter, Resume, Curriculum vitae

Convincing others

TEXT BOOKS:

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

REFERENCES:

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



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

I B. Tech. – II Sem. (ME)

L	T	C
3	1	3

**(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

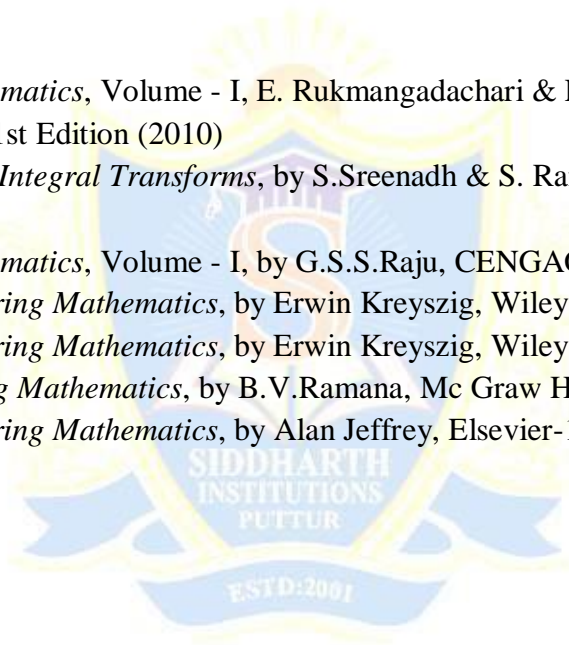
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Method of separation of variables, Solution of one dimensional wave equation, Heat equation and two dimensional Laplace equation under initial and boundary conditions.

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)



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

L	T	C
3	1	3

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

Course Objectives:

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

Course Outcomes:

The student is expected to:

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

UNIT I

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

UNIT II

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

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

Treatment of Boiler Feed water:

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

External Treatment: Ion-Exchange and Permutit processes.

UNIT III

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

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

UNIT IV

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

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

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

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

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

Inorganic polymers: Basic introduction, silicones, polyphosphazines applications.

UNIT V

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

Refractories – introduction, classification, properties and applications.

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

TEXT BOOKS:

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



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

I B. Tech. – II Sem. (ME)

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

Course Objectives:

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

Course Outcomes:

Students undergoing this course are able to

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

INTRODUCTION (Not to be included for examination)

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

UNIT I

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

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.

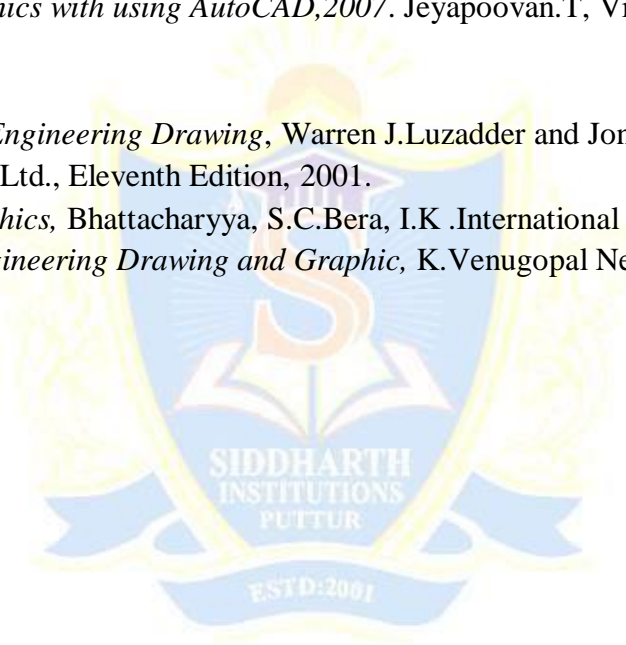
COMPUTER AIDED DRAFTING: Introduction to drafting packages - orthographic views and projections and Isometric projections (demonstration only)

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,



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

I B. Tech. – II Sem. (ME)

L	T	C
3	1	3

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

Course Objectives:

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

Course Outcomes:

Students undergoing this course are able to

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

UNIT-I

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

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

EQUILIBRIUM OF SYSTEM OF FORCES:

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

UNIT-II

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

UNIT-III

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

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

UNIT-IV

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

UNIT-V

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

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

TEXT BOOKS:

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

REFERENCES:

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



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

I B. Tech. – II Sem. (ME)

P	C
4	2

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

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

Course objectives:

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

Course outcomes:

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

UNIT I

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

UNIT II

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

UNIT - III

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

UNIT IV

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

UNIT V

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

Minimum Requirements for ELCS Lab:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system,

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

System Requirement (Hardware component):

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

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

Suggested Software:

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

REFERENCES:

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

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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P C
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**(16HS609) ENGINEERING CHEMISTRY LAB
(Common to CE, EEE & ME)**

Course Objectives:

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

Course Outcomes:

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

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

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

List of Experiments:

Determination of total hardness of water by EDTA method.

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

REFERENCES:

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

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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P C
4 2

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

Course Objective:

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

Course Outcomes:

Students undergoing this course are able to

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

LIST OF EXERCISES:

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

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

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3	1	3

**(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

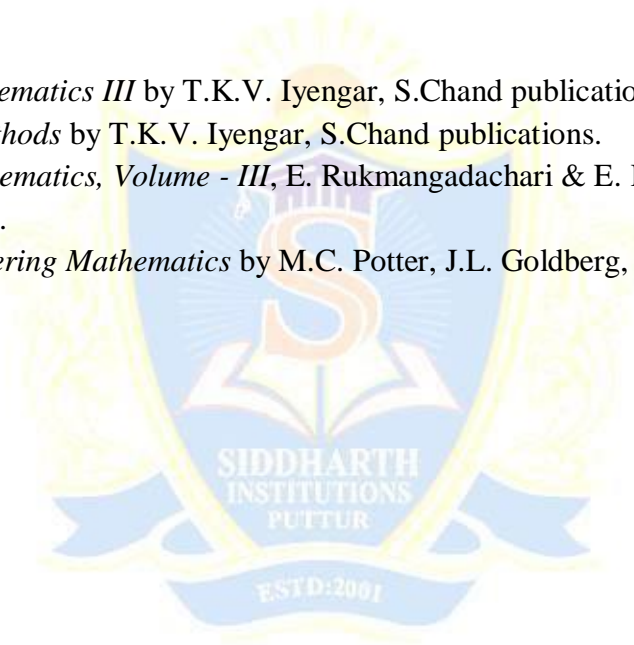
NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor's series, Picard's Method of successive Approximations, Euler's Method, Runge-Kutta second and fourth order methods.

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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(16ME303) MATERIAL SCIENCES AND METALLURGY

Course Educational Objectives:

- *To understand the structure, properties, testing methods and heat treatment methods of metals and non-metals so as to gain knowledge in the selection of suitable materials for various engineering applications.*

Course Outcomes:

Students undergoing this course are able to

- *Describe fundamental scientific (chemistry, physics) and engineering principles (material science) in materials processes and material systems.*
- *Students will get knowledge on bonds of solids and knowing the crystallization of metals*
- *Students can able to understand the equilibrium diagrams and their usage in the production processes.*

UNIT I

STRUCTURE OF METALS: Classification of Materials - Engineering properties of Materials, Bonds in Solids – Metallic bond - Crystallization of Metals, Grain and Grain boundaries, Effect of grain boundaries on the properties of metal / alloys – Determination of grain size

CONSTITUTION OF ALLOYS: Necessity of alloying, Types of solid solutions, Hume Rothery's rules, Intermediate alloy phases, and Electron compounds.

UNIT II

EQUILIBRIUM OF DIAGRAMS - Experimental methods of construction of equilibrium diagrams, Isomorphous alloy systems, Equilibrium cooling and heating of alloys, Lever rule, Coring miscibility gaps, Eutectic systems, Congruent melting intermediate phases, Peritectic reaction.

TRANSFORMATIONS in the solid state – Allotropy, Eutectoid, Peritectoid reactions, Phase rule, Relationship between equilibrium diagrams and properties of alloys. Study of important binary phase diagrams of Cu-Ni-, Al-Cu, and Fe-Fe₃C

UNIT III

CAST IRONS AND STEELS: Structure and properties of White Cast iron, Malleable Cast iron, Grey cast iron, Spheroidal graphite cast iron, Alloy cast irons. Classification of steels, Structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, Tool and die steels.

NON-FERROUS METALS AND ALLOYS: Structure and properties of copper and its alloys, Aluminum and its alloys, Titanium and its alloys.

UNIT IV

HEAT TREATMENT OF ALLOYS: Effect of alloying elements on Iron – Iron carbon system, Annealing, Normalizing, Hardening, TTT diagrams, Tempering, Hardenability, Surface hardening methods, Age hardening treatment, Cryogenic treatment of alloys.

HEAT TREATMENT of plastics, Fracture Mechanism. Mechanical properties of materials & fracture.

UNIT V

CERAMIC MATERIALS: Crystalline ceramics, Glasses, Cermet, Polymeric Materials

COMPOSITE MATERIALS: Classification of composites, Various methods of component manufacture of composites, Particle – Reinforced materials, Fiber reinforced materials, Polymer composites, Metal ceramic mixtures, Metal – Matrix composites and Carbon – Carbon composites.

TEXT BOOKS:

1. *Introduction to Physical Metallurgy*, Sidney H. Avner, US, Tata McGraw-Hill, 2nd Edition, 2007.
2. *Physical Metallurgy*, Raghavan V, Prentice – Hall of India Private Limited, 2nd Edition 2006.
3. *Engineering Materials and Metallurgy*, R.K.Rajput, S.Chand, 1st Edition, 2008.

REFERENCES:

1. *A Text Book of Material Science and Metallurgy for Engineers*, Dr.Kodgiri And Susheel Kodgiri Everest Publishing House, 37th Edition, 2007.
2. *Mechanical Metallurgy*, Dieter, G. E., McGraw Hill, Singapore, 2012.
3. *Material Science and Metallurgy*, Kodgire, V.D, Everest Publishing House, 12th Edition 2002.
4. *A Text Book of Material Science and Metallurgy*, O.P Khanna, M.Lal., Danpath Rai Publications, 5th Edition, 2001.

WEB REFERENCES:

- www.asminternational.org
- www.henry.wells.edu
- www.ce.berkeley.edu
- www.sjsu.edu

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II B.Tech. - I Sem. (ME)

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3	1	3

(16ME304) KINEMATICS OF MACHINERY

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 - Classification of links and kinematic pairs – Sliding, Turning, Rolling, Screw and spherical pairs- Lower and higher pairs- Degree of freedom, Mobility – Kutzbach criterion, Gruebler’s criterion – Grashof’s Law

KINEMATIC INVERSIONS of four-bar chain, Single and double slider crank chains – Quick return mechanisms

UNIT II

MECHANISMS WITH LOWER PAIRS - Straight line motion mechanisms, Peaucellier, Hart, Scottrossel, Grasshopper, Watt, Tchebicheff, Robert and pantograph.

STEERING MECHANISMS - Conditions for correct steering – Davis Steering gear, Ackermanns steering gear. Hooke’s Joint (Universal coupling) -Single and double Hooke’s joint — applications – Simple problems.

UNIT-III

KINEMATICS - Displacement, Velocity and acceleration analysis of simple mechanisms – Graphical method– Velocity and acceleration of polygons

VELOCITY ANALYSIS using instantaneous centers – kinematic analysis of simple mechanisms – Coincident points – Coriolis component of Acceleration

UNIT IV

CAMS - Classification of cams and followers – Terminology and definitions – Displacement diagrams –Uniform velocity, Parabolic, Simple harmonic and Cycloidal motions.

CAM PROFILES – Specified contour cams – Circular arc and tangent cams – Pressure angle and undercutting – Sizing of cams.

UNIT V

GEARS AND GEAR TRAINS - Law of toothed gearing – Involute and Cycloidal tooth profiles – Spur Gear terminology and definitions – Gear tooth action – Contact ratio – Condition for constant velocity ratio for transmission of motion - Interference and undercutting. Helical, Bevel, Worm, Rack and Pinion gears [Basics only].

GEAR TRAINS – Speed ratio, Train value – Parallel axis gear trains – Epicyclic Gear Trains, Differential gear of an automobile, Simple problems only.

TEXT BOOKS:

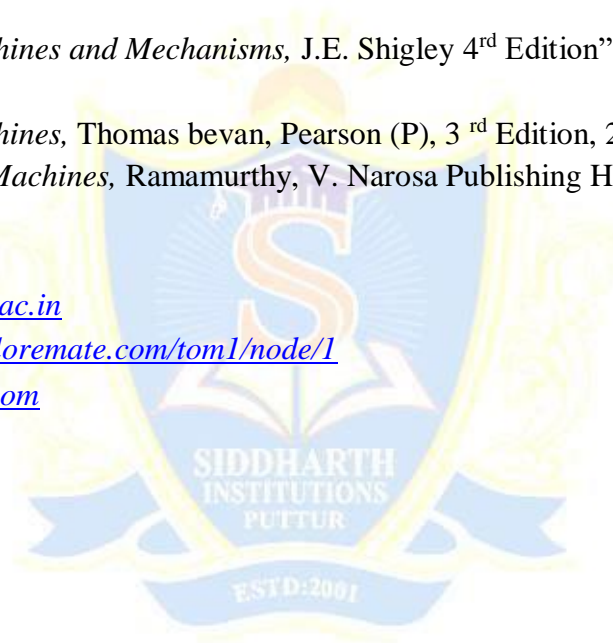
1. *Theory of Machine*, S.S. Rattan, Tata McGraw-Hill, 3rd Edition, 2013.
2. *Theory of Machine*, R.S Khurmi., S Chand Publications, 14th Edition, 2005 .
3. *Kinematics and dynamics of machinery*, R.L.Norton, Tata McGraw-Hill, 1st Edition, 2013.

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.

WEB REFERENCES:

- www.nptel.iitk.ac.in
- www.ptumech.loremate.com/tom1/node/1
- www.youtube.com



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(16ME305) MACHINE DRAWING

Course Educational Objectives:

- *To make the students to understand the concepts of Indian Standard conventions, methods of dimensioning, the title boxes, to draw the machine elements and simple parts.*
- *To make the students to understand and draw assemblies of machine parts and to draw their sectional views.*
- *To develop the imagination and drafting skills of students.*

Course Outcomes:

- *Students can understand the working principles of an assembly or subassembly so that he/she will be able to produce the final product by procuring the units from various sources/suppliers and still produce any useful product serving effectively.*
- *The drawings can be easily prepared and understood by the people in a manufacturing industry.*

UNIT I

MACHINE DRAWING CONVENTIONS: Need for drawing conventions-Introduction to Indian Standard conventions, Conventional representation of material, common machine elements and parts such as screws, Nuts, Bolts, Keys, Gears, Webs, Ribs. Methods of dimensioning, general rules for sizes and placement of dimensions for holes, Centers, Curved and tapered features.

UNIT II:

DRAWING OF MACHINE ELEMENTS AND SIMPLE PARTS: Selection of Views, additional views for the following machine elements and parts with drawing proportions: Popular forms of Screw threads, Bolts, Nuts, Stud bolts, Tap bolts, Set screws. Keys, Cottered joints and knuckle joint
Riveted joints for plates, Flanged & Protected flanged joint.

UNIT III:

ASSEMBLY DRAWINGS: Drawings of assembled views for the part drawings of the following. Engine parts - Stuffing boxes, Eccentrics, Petrol Engine-connecting rod, Screw jack, Single tool post.

PART DRAWING: Stuffing boxes, Eccentrics, Petrol Engine-connecting rod, Screw jack, single tool post.

COMPUTER AIDED DRAFTING: Stuffing boxes, Eccentrics, Petrol Engine-connecting rod, Screw jack.

TEXT BOOKS:

1. *Machine Drawing*- K.L. Narayana, P.Kannaiah & K.Venkata Reddy, New Age Publishers, 4th Edition, 2012.
2. *Machine Drawing*- Dhawan, S.Chand Publications, 1st Revised Edition, 1998.

REFERENCES:

1. *Machine Drawing*- P.S. Gill, S.K. Kataria & Sons, 17th Edition, 2012.
2. *Machine Drawing*- Luzzader, PHI Publishers, 11th Edition, 2012
3. *Machine Drawing* – Rajput, S. Chand Pub, 2007.

NOTE:

- The End exam will be for 4 hrs in the following format
- All answers should be on the drawing sheet only. Answers on the drawing sheet only will be valued.
- Students have to use First angle Projections



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(16CE104) STRENGTH OF MATERIALS

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.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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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 Durgaiyah D., New Age International, 2002.

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P C
4 2

(16CE109) STRENGTH OF MATERIALS LAB

Course Objectives:

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

Course Outcomes:

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

- *Estimate Young's modulus, tensional rigidity of mild steel rods.*
- *Know the hardness of mild steel and HYSID 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.
1. Torsion test on mild steel rod.
2. Impact test.
3. Shear test.
4. Continuous beam – deflection test.
5. Hardness test on metals (Rockwell and Brinell Hardness Number Tests).
6. Verification of Maxwell's Reciprocal theorem on beams.

LIST OF EQUIPMENT:

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

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4 2

(16CE116) FLUID MECHANICS AND 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.

LIST OF EQUIPMENT:

1. Venturimeter Setup.
2. Orifice meter setup.
3. Friction factor and Minor losses test setup.
4. Impact of jets.
5. Pelton wheel and Francis turbines.
6. Centrifugal pumps.
7. Bernoulli's theorem setup.
8. Hydraulic jump test setup.
9. Kaplan turbine.
10. Rectangular and Triangular notch setups
11. Small orifice and mouth piece setup.



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(COE-I) COMPREHENSIVE ONLINE EXAMINATION -I

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

II B. Tech -I Sem. (ME)			L
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**(16CS503) DATA STRUCTURES THROUGH C
(AUDIT COURSE)
(Common to CE, EEE, ME & ECE)**

Course Objectives:

- Understand different data structures
- Understand searching and sorting techniques

Course Outcomes:

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

UNIT I

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

UNIT II

STACKS: Introduction-Definition-Representation of Stack-Operations on Stacks-Applications of Stacks. **Queues:** Introduction, Definition- Representations of Queues-Variou 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. (ME)

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3	1	3

(16HS613) PROBABILITY & STATISTICS

(Common to EEE, CE, ME & CSE)

Course Objectives:

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

Course Outcomes:

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

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

Have acquired a proper level of competence for employability

UNIT-I

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

UNIT-II

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

UNIT-III

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

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

UNIT-IV

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

UNIT-V

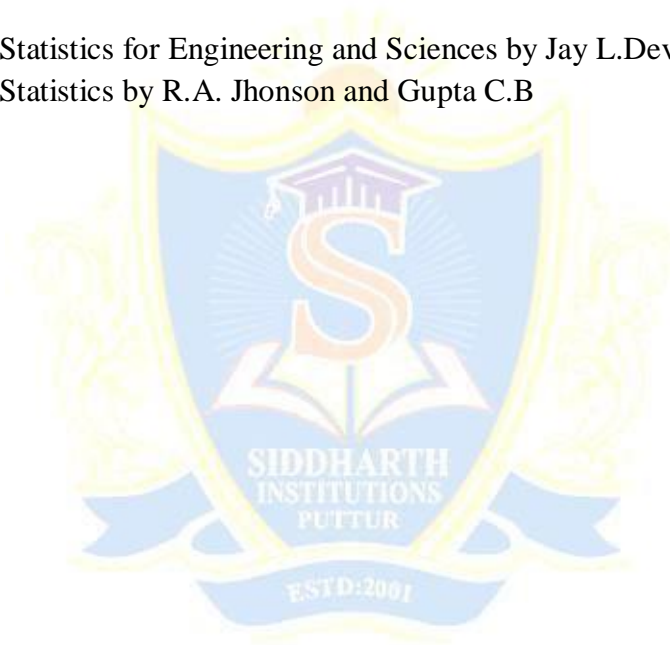
Statistical Quality Control: Concept of quality of a manufactured product, Defects and Defectives, Causes of variations, Random and assignable, The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics, Constructions and operation of X- bar Chart, R-Chart, P-Chart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

TEXT BOOKS:

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

REFERENCES:

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



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II B.Tech. - II Sem. (ME)

L	T	C
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(16EE207) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

**PART – A
BASIC ELECTRICAL ENGINEERING**

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.*

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.

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.

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.

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 and Electronics Engineering*, M.S.Sukhija, T.K.Nagsarkar, Oxford University, Press, 1st Edition, 2012.
2. *Basic Electrical and Electronics Engineering*, S.K Bhattacharya, Pearson Education, 2012

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L	T	C
3	1	3

(16ME306) MANUFACTURING TECHNOLOGY

Course Educational Objectives:

- *To understand the various manufacturing processes and machining related to casting, joining of metals, moulding and advanced processes.*
- *Metal forming, extrusion, processing of plastic materials and rapid manufacturing processes are highly nonlinear because they involve geometric, material and contact non linearity and hardening, hot and cold working process.*

Course Outcomes:

Students undergoing this course are able to

- *Demonstrate knowledge of engineering principles (metallurgy, mechanics, and/or material science) in manufacturing processes.*
- *Use appropriate machine tool equipment, standardized methods and apparatus for manufacturing processes.*
- *Use finite element software to simulate physical behaviors of mechanical structures or systems.*
- *Apply FEA principles for component and assembly design.*

UNIT I

METAL CASTING PROCESSES -Sand Casting – Sand Mould – Type of patterns - Pattern Materials – Pattern allowances – Moulding sand Properties and testing – Cores –Types and applications – Moulding machines – Types and applications– Melting furnaces – Principle of special casting processes- Shell, Investment – Ceramic mould – Pressure die casting – Centrifugal Casting – CO₂ process – Stir casting - Defects in Sand casting.

UNIT II

JOINING PROCESSES - Fusion welding processes – Type of Gas welding – Flame characteristics – Filler and Flux materials – Arc welding, Electrodes, Coating and specifications – Principles and types of Resistance welding – Gas metal arc welding – Submerged arc welding – Electro slag welding – Gas Tungsten arc welding - Electron Beam Welding- Weld defects – Brazing and soldering – methods and process capabilities – Adhesive bonding, Types and applications

UNIT III

METAL DEFORMATION PROCESSES- Hot working and cold working of metals – Forging processes – Open, impression and closed die forging – Characteristics of the

processes – Typical forging operations – rolling of metals – Types of Rolling – Flat strip rolling – shape rolling operations – Defects in rolled parts – Principle of rod and wire drawing – Tube drawing – Principles of Extrusion – Types – Hot and Cold extrusion

UNIT IV

SHEET METAL PROCESSES - Sheet metal characteristics – Typical shearing, bending and drawing operations – Stretch forming operations – Formability of sheet metal– Metal spinning – Introduction of Explosive forming, magnetic pulse forming, peen forming, Super plastic forming – Micro forming.

UNIT V

MANUFACTURE OF PLASTIC COMPONENTS- Types and characteristics of plastics – Moulding of thermoplastics – working principles and typical applications – injection moulding – Plunger and screw machines – Compression moulding, Transfer Moulding – Typical industrial applications – introduction to blow moulding –Rotational moulding – Film blowing – Extrusion – Thermoforming – Bonding of Thermoplastics.

TEXT BOOKS:

1. *Elements of workshop Technology*, S.K Hajra Chouldhary and AK Hajra Choudhury, Volume I and II, Media promoters and Publishers Private Limited, Mumbai, 1997
2. *Manufacturing Technology Foundry, Forming and Welding*, P.N. Rao, , 4th Edition, Tata Mc Graw Hill, 2003
3. *Manufacturing Technology*, Kalpakjian, Pearson Education India Edition, 2006

REFERENCES:

1. *Production Technology*, R.K. Jain, Khanna Publishers, 17th edition, 2012
2. *Materials and Processes, in Manufacturing*, Paul Degarma E, Black J.T and Ronald A. Kosher, 8th Edition, Prentice – Hall of India, 1997.
3. *Principles of Metal Castings*, Rosenthal, 2nd Edition, Tata Mc Graw Hill, 2001
4. *Manufacturing Technology*, R.K. Rajput, 1st Edition, Laxmi Publishers, 2007

WEB REFERENCES:

- NPTEL Lectures
- www.teacher.buet.ac.bd
- www.me.emu.edu
- www.en.wikipedia.org

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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II B.Tech. - II Sem. (ME)

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(16ME307) ENGINEERING THERMODYNAMICS

Course Educational Objectives:

- *To understand the basic laws of thermodynamics and their application to the non-flow and flow processes.*
- *To understand the thermodynamic properties of ideal and real gases, gaseous mixtures.*
- *To get the awareness on thermodynamic principles, skills to perform the analysis and design of thermodynamic systems.*

Course Outcomes:

Students undergoing this course are able to

- *Apply the laws of thermodynamics to analyze thermal systems.*
- *Can understand the energy transformation from one system to other system.*
- *Can understand the working principles of I.C. Engines.*

UNIT I

BASIC CONCEPTS - Basic concepts, Concept of continuum, Microscopic and Macroscopic approach, Thermodynamic systems (closed, open, isolated), homogeneous & heterogeneous systems control volume, property, point and path functions, Thermodynamic equilibrium, State, Path and process, Reversible and Quasi-static process, Work, Modes of work, Zeroth law, Concept of temperature and heat.

UNIT II

FIRST LAW OF THERMODYNAMICS- First law, Application to closed and open systems, Internal energy, Enthalpy, Specific heat capacities (C_p & C_v), Steady flow process mass balance and energy balance for a single steady flow with reference to various engineering devices.

UNIT III

SECOND LAW OF THERMODYNAMICS - Second law – Kelvin, Planck and Clausius statements, Heat engine, Refrigerator and Heat pump, Efficiency and COP, Thermodynamic temperature scale, Reversibility and Irreversibility, Carnot cycle, Clausius Inequality, Concept of entropy, Entropy of ideal gases, Principle of increase of entropy, Quality of energy, Energy (Availability), Reversible work, Energy and Irreversibility for closed system and control volume, Second law efficiency.

UNIT IV

IDEAL & REAL GASES - Properties of ideal and real gases, Avogadro's hypothesis and gas laws, Vander Walls and other equations of state, Principle of corresponding states, Compressibility factor, Generalized compressibility charts. Non- reactive ideal gas mixtures, Mass and Mole fractions, Dalton's law of additive pressures, Amagat's law of additive volumes, Properties of ideal gas mixtures

UNIT V

GENERAL THERMODYNAMIC PROPERTY RELATIONS: Partial derivatives and associated relations, Differential relations for U, H, G and A, Maxwell's relations, Clausius Clapeyron equation, Joule Thomson coefficient, Air and Gas tables.

AIR STANDARD CYCLES: Carnot Cycle, Sterling Cycle, Ericson Cycle, Otto Cycle, Diesel Cycle, Dual Cycle, their applications, comparison of Otto, Diesel and Dual cycles, Second Law Analysis of Gas Power Cycles

TEXT BOOK:

1. *Engineering Thermodynamics*, P K Nag, Tata McGraw Hill, 6th Edition, 2013
2. *Thermal Engineering*, R.K.Rajput, , Lakshmi Publications, 7th Edition, 2015
3. *Thermal Engineering*, P.L.Balleny, Khanna Publications, 9th Edition.2009

REFERENCES:

1. *Thermodynamics - An Engineering Approach*, Yunus A Cengel / Michael A Boles, Tata Mc Graw Hill India, 7e,Special Indian Edition 2011.
2. *Thermodynamics and Heat Engines*, Yadav R., Vol 1, Central Publishing House, 2011.
3. *Engineering Thermodynamics*, J.B. Jones and R.E.Dugan.,Prentice Hall of India, 2010.
4. *Basic Engineering Thermodynamics*, T. Roy Choudry., , Tata McGraw Hill, Second Edition 2012.

WEB REFERENCES:

www.nptel.iitm.ac.in

www.usstudy.in

www.youtube.com

www.teacher.buet.ac.bd

www.me.emu.edu

www.animatedengines.com

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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II B.Tech. - II Sem. (ME)

L	T	C
3	1	3

(16ME308) DYNAMICS OF MACHINERY

Course Educational Objectives:

- *To understand the static and dynamic force analysis of Mechanisms.*
- *To understand the static and dynamic balancing of rotating and reciprocating masses, concept of free and forced vibration and their analysis.*

Course Outcomes:

Students undergoing this course are able to

- *Understand and apply the basic principles of dynamics.*
- *Relate the motion of parts in a machine using the principles of kinematics.*

UNIT I

PRECESSION- Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

TURNING MOMENT DIAGRAMS AND FLY WHEELS: Turning moment diagrams for steam engine, IC Engine and multi cylinder engine. Crank effort - Coefficient of Fluctuation of energy, Coefficient of Fluctuation of speed – Fly wheels and their design, Fly wheels for Punching machines.

UNIT II

FRICTION - Inclined plane, friction of screws and nuts, pivot and collar, uniform pressure, uniform wear. Friction circle and friction axis, lubricated surfaces, boundary friction, film lubrication.

CLUTCHES - Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch

UNIT III

BRAKES AND DYNAMOMETERS - Simple block brakes, Band brake, internal expanding brake, braking of vehicle. Dynamometers – absorption and transmission types- Prony brake, Rope brake, Epicyclic-train & torsion dynamometers- General description and methods of operation.

GOVERNORS - Watt, Porter and Proell governors. Spring loaded governors – Hartnell and Hartung governors with auxiliary springs. Sensitiveness, isochronism and hunting. Effort and power of a governor.

UNIT IV:

BALANCING - Balancing of rotating masses - single and multiple – single and different planes.

BALANCING OF RECIPROCATING MASSES: Primary and Secondary balancing of reciprocating masses. Analytical and graphical methods. Unbalanced forces and couples – V-engine, multi cylinder in- line and radial engines for primary and secondary balancing.

UNIT V

MECHANICAL VIBRATIONS - Free and forced vibration of single degree of freedom system, Role of damping, whirling of shafts and critical speeds. Simple problems on free, forced and damped vibrations. Vibration Isolation & Transmissibility. Transverse vibrations of beams with concentrated and distributed loads. Dunkerly's method, Raleigh's method. Torsional vibrations - two and three rotor systems.

TEXT BOOKS:

1. *Theory of Machines*, R.S. Khurmi, Khanna Publishers, 2003.
2. *Theory of Machines*, S. S. Ratan, Tata McGraw Hill, 2 nd Edition, 2005
3. *Theory of Machines*, Thomas Bevan, CBS Publishers, 3rd Edition, 1984

REFERENCES:

1. *Theory of Mechanisms and Machines*, Ghosh A. and Mallick A.K., Affiliated Pvt. Ltd., 1988.
2. *Theory of Machines and Mechanisms*, Shigley J.E. and Uicker J.J., McGraw-Hill, Inc., 1995.
3. *Mechanism and Machine Theory*, J.S Rao. and R.V Dukkupati, Wiley-Eastern Limited, 1992.

WEB REFERENCES:

www.nptel.iitm.ac.in

www.usstudy.in

www.youtube.com

www.teacher.buet.ac.bd

www.me.emu.edu



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(16ME309) MANUFACTURING TECHNOLOGY LAB

Course Educational Objectives:

- *To understand the various manufacturing processes and machining related to casting, forming, joining of metals, moulding and extrusion processes of plastic materials.*

Course Outcomes:

Students undergoing this course are able to

- *Demonstrate knowledge of engineering principles (metallurgy, mechanics, and/or material science) in manufacturing processes.*
- *Use appropriate machine tool equipment, standardized methods and apparatus for manufacturing processes.*

I. METAL CASTING LAB:

- a. Pattern Design and making - for casting drawing.
- b. Sand properties testing - Exercise -for strengths, Moisture, Grain size and permeability
- c. Moulding: Melting and Casting

II. WELDING LAB:

- a. Arc Welding: Lap & Butt Joint
- b. Spot Welding

III. MECHANICAL PRESS WORKING:

- a. Blanking & Piercing operation and study of simple, compound and progressive press tool.
- b. Hydraulic Press: Deep drawing and extrusion operation.

IV. PROCESSING OF PLASTICS:

- a. Injection Moulding
- b. Blow Moulding

V. SOLDERING PROCESSING

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(16EE208) ELECTRICAL AND ELECTRONICS ENGINEERING LAB

**PART- A
ELECTRICAL LAB**

1. Verification of Superposition Theorem.
2. Verification of Thevenin's Theorem.
3. Determination of Open circuit and Short circuit parameters
4. Swinburne's Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt Machine Working as Motor and Generator).
5. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
6. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at Given Power Factors).

**PART – B
ELECTRONICS LAB
(Any Six Experiments)**

1. P-N Junction Diode and Zener Diode Volt-Ampere Characteristics.
2. Bipolar Junction Transistor in CB Configuration-Input and Output Characteristics, Computation of α .
3. Half-Wave Rectifier- a) Without Filter b) With Capacitor Filter.
4. Full-Wave Rectifier- a) Without Filter b) With Capacitor Filter.
5. Bipolar Junction Transistor in CE Configuration-Input and Output Characteristics, Computation of β .
6. Junction field effect Transistor in Common Source Configuration Output and Transfer Characteristics.
7. Verification of Logic Gates- AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

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(16ME305) MATERIAL SCIENCES AND METALLURGY LAB

Course Educational Objectives:

- *Experiments to find Types of Metals, Steels, Cast irons and their Microstructures; Heat Treatment procedures; Data acquisition and recording; Grain size analysis; Phase segmentation.*

Course Outcomes:

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

- *Prepare metallographic samples for microscopic examinations.*
- *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.*
- *Use the software for various analyses of microstructures.*

LIST OF EXPERIMENTS

1. Preparation and study of the Micro Structure Iron.
2. Preparation and study of the Micro Structure Cu.
3. Preparation and study of the Micro Structure Al.
4. Preparation and study of the Microstructure of Mild steels,
5. Preparation and study of the Microstructure of low carbon steels,
6. Preparation and study of the Microstructure of high – C steels.
7. Study of the Micro Structures of Cast Irons.
8. Study of the Micro Structures of Non-Ferrous alloys.
9. Study of the Micro structures of Heat treated steels.
10. Hardenability of steels by Jominy End Quench Test.
11. To find out the hardness of various treated steels.
12. To find out the hardness of various untreated steels.

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(COE-II) COMPREHENSIVE ONLINE EXAMINATION -II

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

II B. Tech -II Sem. (ME)

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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.

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

III B.Tech - I Semester (ME)

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(16ME311) Industrial Engineering & Management

Course Educational Objectives:

- *To understand the basic concepts of plant layout, production systems, work study and quality control*
- *To understand the importance of inventory and ERP systems.*

Course Outcomes:

Students undergoing this course are able to

- *Understanding the concepts of production systems, work study and plant layout*
- *Understanding the concepts of production planning and inventory management systems.*

UNIT-I

Concepts of Management-Administration and Organization – Functions of Management – Schools of Management Thought: Taylor’s Scientific Management, Fayola’s Principles of Management, Douglas McGregor’s Theory X and Y, Mayo’s Hawthorne Experiments, Herzberg’s Two factor Theory of Motivation, Maslow’s Hierarchy of Human needs – Systems Approach to Management.

Organizational Structures- Functional- Divisional- Matrix etc., Basic Concepts Related to Organization – Departmentation and Decentralization and their Merits, Demerits and Suitability

UNIT-II

Plant Location: Definition, Factors affecting the Plant Location, Comparison of Rural and Urban sites, Methods for Selection of Plant – Matrix Approach

Plant Layout: Definition, Objectives, Organization, Types of Production, Types of Plant Layout – Various Data Analyzing Forms – Travel Chart, Optimization of Layout-Load Distance Model & CRAFT-Materials Handling Function-Objectives - Types-Selection Criteria of Material Handling Equipment.

UNIT-III

Work Study – Definition, Objectives, and Method Study – Definition, Objectives, and Steps Involved – Various Types of Associated Charts – Differences between Micro motion and Memo motion Studies.

Work Measurement - Definition, Time Study, Steps involved - Equipment, Different Methods of Performance Rating - Allowances, Standard Time Calculation. Work Sampling - Definition, Steps Involved, Differences with Time Study – Applications

UNIT-IV

Material Management – Objectives, Inventory – functions, types, associated cost, inventory classification techniques- ABC Analysis; Inventory Models- Deterministic models- EOQ Model –Models with one Price Break and Multiple Price Breaks- shortages are not allowed – Stochastic Models – Demand may be Discrete Variable or Continuous Variable –

Instantaneous Production. Instantaneous Demand and Continuous Demand and No Set-up Cost.

UNIT-V

Human Resource Management-Functions of HRM, Job Evaluation, Merit Rating-Difference with Job Evaluation, Different Methods of Merit Ratings, Wage Incentives, Different Types of Incentive Schemes Inspection & Quality Control: Differences between Inspection & Quality Control. Statistical Quality Control- Techniques-Variables and Attributes- Control Charts: X and R Charts; P Charts and C Charts. Acceptance Sampling Plan - Single Sampling and Double Sampling Plans- OC Curves. Introduction to TQM- Quality circles-BIS & ISO Standards-Importance and Evaluation Procedure
Marketing Management- Introduction, Marketing Vs. Selling, Market Segmentation

TEXT BOOKS:

1. *Manufacturing Organization and Management*, T.Amrine, Pearson, 2nd Edition, 2004
2. *Industrial Engineering and Management*, Dr. C.Nadamuni Reddy, New Age International Publishers, 1stEdition, 2011.

REFERENCES:

1. *Industrial Engineering and production management*, MartindTelsang S.Chand, 2012.
2. *Industrial Engineering and Management*, O.P.Khanna, DhanpatiRai, 18th edition, 2013.
3. *Work Study* by ILO(International Labor Organization)
4. *Management* by James AF Stoner, Freeman 6th Ed, Pearson Education, New Delhi,2005



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

III B.Tech-I Semester (ME)

L T C

(16ME312)Thermal Engineering

3 1 3

Course Educational Objectives:

- *To understand the applied thermodynamic concepts, the construction and the working principles of various engineering devices such as IC Engines, steam generators, steam nozzles, steam turbine.*

Course Outcomes:

Students undergoing this course are able to

- *Apply basic knowledge of the principles of thermal systems.*
- *To apply the thermodynamic concepts into various thermal application like IC engines, Steam Turbines, Compressors and Refrigeration and Air conditioning systems.*

UNIT-I

I.C. Engines- Definition of Engine And Heat Engine, I.C Engine Classification – Parts of I.C.Engines, Working Two Stroke & Four Stroke I.C.Engines SI & CI Engines, Valve and Port Timing Diagrams. Normal and abnormal combustion, stage of combustion in SI and CI Engines- Pre-ignition and knocking.

Testing and Performance - Parameters of Performance - 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.

UNIT-II

Air Compressors- Classification of Compressors-Reciprocating and Rotary Compressors, Effect of Clearance volume in Compressors, Volumetric Efficiency, Single Stage and Multi Stage Compressors, Effect of Inter cooling and Pressure Drop in Multi - Stage Compressors-Problems

UNIT-III

Vapour Power Cycle- Rankine cycle-Layout, Thermodynamic Analysis, Concept of Mean Temperature of Heat Addition, Rankine cycle Efficiency, Heat balance sheet of steam generator.

Methods of Improve cycle performance-Regeneration, Reheat, Combined cycle Its Efficiency's, Brayton cycle, combined steam and gas turbine cycles

UNIT-IV

Steam Nozzles and Condenser- Expansion of steam through nozzle-types of nozzles-condition for maximum discharge- critical pressure ratio- effect of friction – super saturated flow. Velocity co-efficient, Degree of super Saturation and Degree of under Cooling, Condenser, Type of Condensers

UNIT-V

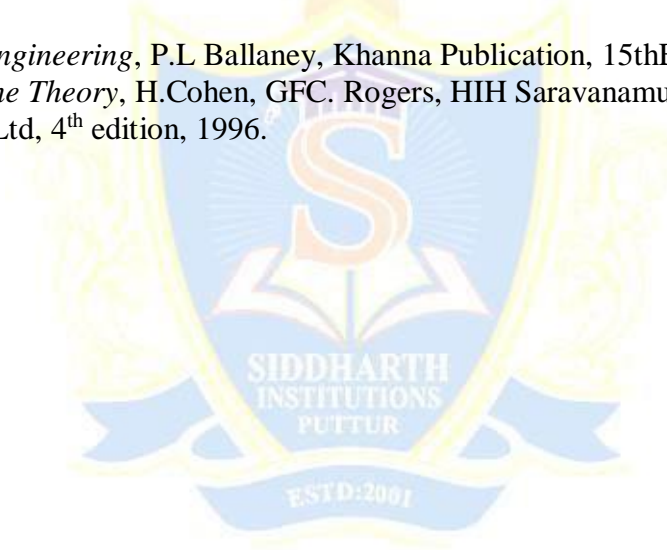
Steam Turbines - Principles of impulse, reaction and impulse-reaction turbines-compounding-velocity diagrams for simple & multistage turbines-work done on turbine blades & efficiencies-losses in steam turbines- governing of steam turbines.

TEXT BOOKS:

1. *Thermal Engineering*, Rajput, R. K., Laxmi Publications, 6th Edition, New Delhi, 2010.
2. *Internal Combustion Engines* / V. Ganesan- TMH, 4th Edition, 2012

REFERENCES:

1. *A Course in Thermal Engineering*, Domkundwar,A., Dhanpat Rai & Co., New Delhi, 2003.
2. *I.C engines fundamentals* J.B Heywood, , Mc Graw Hill International Edition .1999.
3. *Fundamentals of I.C Engines*, P.W Gill. J.H Smith & E.J Ziurgs, Oxford& I B H Publication 1990, New Delhi.
4. *Thermodynamics & Heat Engines vol-II*,R.YADAV, Central Publishing House, 1996.
5. *Steam & Gas Turbines*, R.YADAV, Central Publishing House, 1996.
6. *International Combustion Engines*, V.Ganesan, Tata McGraw Hill, Second Edition, 1999.
7. *Thermal Engineering*, P.L Ballaney, Khanna Publication, 15thEdition, 2002.
8. *Gas Turbine Theory*, H.Cohen, GFC. Rogers, HIH Saravanamutto, Addition Wesley Longman Ltd, 4th edition, 1996.



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

III B.Tech - I Semester (ME)

L T C

(16ME313) Non- Conventional Energy Resources

3 1 3

Course Educational Objectives:

- *To Understand and analyze the pattern of renewable energy resources Suggest methodologies / technologies for its utilization Economics of the utilization and environmental aspects.*

Course Outcomes:

- *Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.*

UNIT I

Introduction-World Energy Use –Classification of Energy"s-Reserves of Energy Resources – Environmental Aspects of Energy Utilization –Need of Renewable Energy–Renewable Energy Scenario in Andra Pradesh, India and around the World.

UNIT II

Solar Energy-Solar Radiation –Measurements of Solar Radiation -Flat Plate and Concentrating Collectors –Solar direct Thermal Applications –Solar thermal Power Generation -Fundamentals of Solar Photo Voltaic Conversion –Solar Cells –Solar PV Power Generation –Solar PV Applications.

UNIT-III

Wind Energy-Wind Data and Energy Estimation –Types of Wind Energy Systems –Performance – Site Selection –Details of Wind Turbine Generator –Safety and Environmental Aspects.

UNIT-IV

Bio –Energy-Biomass direct combustion –Biomass gasifiers –Biogas plants –Digesters –Ethanol production –Bio diesel –Cogeneration -Biomass Applications

UNIT-V

Other Sources of Energy - Tidal energy – Wave Energy – Open and Closed OTEC Cycles –Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems.

TEXT BOOKS:

1. *"Non-Conventional Energy Sources"* Rai. G.D., Khanna Publishers, New Delhi, 2011.
2. *"Renewable Energy Sources"*, Twidell, J.W. & Weir, A., EFN Spon Ltd., UK, 2006.

REFERENCES:

1. *"Solar Energy"*, Sukhatme. S.P., Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.
2. *"Renewable Energy, Power for a Sustainable Future"*, Godfrey Boyle, Oxford University Press, U.K., 1996.
3. *"Fundamentals Design, Modelling & Applications"*, Tiwari. G.N., Solar Energy – Narosa Publishing House, New Delhi, 2002.
4. *"Wind Energy Conversion Systems"*, Freris. L.L., Prentice Hall, UK, 1990.
5. *"Wind Energy Systems"*, Johnson Gary, LPrentice Hall, New York, 1985
6. *"Introduction to Biofuels"*, David M. Mousdale –CRC Press, Taylor & Francis Group, USA 2010
7. *"Fundamentals, Technologies and Applications"* Chetan Singh Solanki, Solar Photovoltaics, , PHI Learning Private Limited, New Delhi, 2009.



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

III B.Tech-I Semester (ME)

L T C

(16ME314) Design Of Machine Elements– I

3 1 3

Course Educational Objectives:

- *To familiarize the various steps involved in the Design Process*
- *To understand the principals involved in evaluating the shape and dimensions of a component to satisfy functional and strength requirements.*
- *To learn to use standard practices and standard data*
- *To learn to use catalogues and standard machine components*

Course Outcomes:

Students undergoing this course are able to

- *Upon completion of this course, the students can able to successfully design machine Components*

UNIT - I

Introduction –Concept of Design, Types of design, general considerations and standards of design, design procedure, selection of engineering materials, properties, manufacturing considerations in the design, BIS codes of materials, preferred numbers.

Stress in Machine Members: simple stresses, torsional and bending stresses, combined stresses, impact stresses, stress-strain relation, Failure from static loading, types of failure from static loading, Modes of failures, factor of safety

UNIT-II

Design for Fatigue Loads-Variable (fatigue) stresses, stress concentration, notch sensitivity, and design for fluctuating stresses fatigue failure, endurance limit, estimation of endurance strength, Goodman’s line, Soderberg’s line and Gerber’s line, Modified Goodman’s Line design of components for finite and infinite life.

UNIT III

Design of Mechanical (Bolted and Riveted) Joints- Forms of Screw threads, Stresses in Screw fasteners, Design of bolts with pre-stresses, Design of bolted joints under eccentric loading, Bolts of uniform strength. Types of riveted heads, riveted joints, types of failure, efficiency of joint, eccentric loading, design of riveted joints.

Design of Welded Joints-Introduction, Advantages and Disadvantages of Welded Joints over Riveted Joints, Axially Loaded Unsymmetrical Welded Sections, Eccentrically Loaded Welded Joints.

UNIT-IV

Design of Mechanical (Cotters and Knuckle) Joints- Spigot and socket, sleeve and cotter, jib and cotter joints, Knuckle joint

Design of Shafts- Shaft design on the basis of strength, torsional rigidity and lateral rigidity, ASME, code for shaft design.

UNIT-V

Design of Keys- Sunk, saddle, round, woodruff, splines, keyways.

Design of Couplings- Design of rigid couplings- sleeve or muff, split-muff or compression and flange couplings, design of flexible couplings- bushed pin type flange coupling.

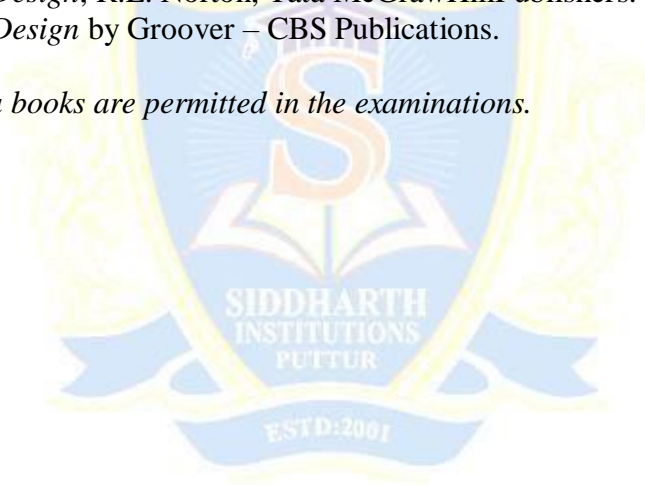
TEXT BOOKS:

1. *Design of Machine Elements*, V.B. Bhandari, and TMH Publishers, New Delhi.
2. *Machine Design*, Schaum's series, TMH Publishers, New Delhi.
3. *Machine Design*, R.K. Jain, Khanna Publishers, New Delhi.

REFERENCES:

1. *Machine Design*, Sadhu Singh, Khanna Publishers, New Delhi.
2. *Machine Design*, R.S. Kurmi and J.K. Gupta, S.Chand Publishers, New Delhi.
3. *Mechanical Engineering Design*, Joseph E. Shigely, TMH Publishers, New Delhi,
4. *Design of Machine Elements*, M.F. Spotts, PHI Publishers, New Delhi.
5. *Machine Design*, Pandya and Shah, Charotar Publishers, Anand.
6. *Machine Design*, R.L. Norton, Tata McGrawHillPublishers.
7. *Machine Design* by Groover – CBS Publications.

NOTE: Design data books are permitted in the examinations.



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

III B.Tech - I Semester (ME)

L T C

(16ME315) Automobile Engineering

3 1 3

Course Educational Objectives:

- *To impart knowledge to students in various systems of Automobile Engineering and to learn the fundamental principles, construction and auxiliary systems of automotive engines.*

Course Outcomes:

Students undergoing this course are able to

- *Understanding of science and engineering principles relevant to automobile engineering.*
- *Design and critically evaluate components, processes or systems related to automobile.*

UNIT-I

Engine Components & Chassis: - IC engine components-Functions-Materials, combustion and combustion chamber. Types of drives. Types of Automobiles-vehicle chassis, frame and body construction

UNIT-II

Fuel Supply System: Fuel injection system for MPFI, CRDI, Turbo charger, Pollution standards, National & International pollution control techniques- Three way catalytic converter, Alternate fuels.

UNIT-III

Ignition System: Need- Battery coil and magnetic coil ignition system, Engine cooling system- Necessity -types.

Engine lubrication- Properties of Lubricants- Grading- Types of lubrication Systems- Filters

Electrical system- Starting system- Bendix drive. Solenoid switch- lighting- horn- wiper- fuel gauge- speedometer- temperature indicator

UNIT-IV

Transmission System: - Clutches- Need- classification- fluid coupling- materials and required properties.

Gear Box- Types- over drive- torque converter, propeller shaft- hotch-kiss drive, torque tube drive, Universal Joint, Differential, Rear Axle, front axle.

UNIT-V

Steering system, Suspension system & Braking system: - Steering gears, Steering Mechanism – Ackerman Steering Mechanism & Davis Steering Mechanism.

Suspension System: Rigid Axle Suspension System and Independent Suspension System- Torque bar, shock absorber.

Braking System: Air Brakes, Hydraulic Brake System, Pneumatic and Vacuum Brake Systems, ABS, EBD and Traction control.

TEXT BOOKS:

1. *Automotive Mechanics* – Vol. 1 & Vol. 2, Kirpal Singh, Standard Publishers Distributors, 13th edition, 2013.
2. *Automobile Engineering*, William Crouse, TMH, 10th edition, 2006

REFERENCES:

1. *Internal combustion engines – theory and practice* Ramalingam, K.K., SciTech Publication India Pvt. Ltd, Chennai, 2000
2. “*Automotive engines*” William H. Crouse, McGraw Hill publishers, 1985.
3. Marco Nute-Emissions from two stroke engines, SAE Publication-1998
4. “*Automotive chassis and body*” Crouse W.H.-McGraw hill, New York-1971
5. *Automobile Engineering*, R.K. Rajput, Laxmi Pub, 1st edition, 2013.



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

III B.Tech - I Semester (ME)

L T C

(16ME316) Machine Tools

3 1 3

Course Educational Objectives:

- *To understand the basic theory of metal cutting and the working principles of various machine tools such as lathe, shaping, milling, drilling, grinding, broaching, gear cutting machines and unconventional machining processes, CNC machine tools*
- *To understand the basic principles of design of jigs and Fixtures*

Course Outcomes:

Students undergoing this course are able to

- *Understanding of concepts and basic mechanics of metal cutting, working of standard machine tools such as lathe, shaping, milling, drilling, grinding and allied machines, and broaching.*
- *Use appropriate machine tool equipment, standardized methods and apparatus for manufacturing processes.*

UNIT-I

Introduction of Metal Cutting Theory – Basic Elements of cutting, methods of metal cutting –classification of cutting tools – Geometry of single point tool and angles, chip formation and types of chips – built up edge and its effects, chip breakers.

UNIT-II

Cutting Force Analysis- Mechanics of orthogonal cutting-Merchant's Force diagram, cutting forces – cutting speeds, feed, depth of cut, tool life, coolants. Cutting Tool materials and cutting fluids –types and characteristics.

UNIT-III

Engine lathe – Principle of working- specification of lathe – types of lathes – work holders and tool holders –Taper turning, thread turning and attachments for Lathes. Turret and capstan lathes – collet chucks – other work holders – tool holding devices – box and tool layout. Principle features of automatic lathes – classification – Single spindle and multi-spindle automatic lathes.

UNIT-IV

Drilling and Boring Machines – Principles of working, specifications, types, operations performed – tool holding devices – twist drill – Boring tools – machining time calculation.

Shaping, Slotting and planing machines –Principles of working – Principal parts – specification, classification, Operations performed.

Milling machine – Principles of working – specifications – classifications of milling machines – Principal features – machining operations, Types and geometry of milling cutters– methods of indexing – Accessories to milling machines.

UNIT-V

Grinding machine –Theory of grinding – classification– cylindrical and surface grinding machine – Tool and cutter grinding machine – special types of grinding machines – Grinding wheel: Different types of abrasives – bonds, specification and selection of a grinding wheel
Lapping, Honing and Broaching machines – comparison of grinding, lapping and honing and types of broaching machines.

Jigs and fixtures-Principles of design and uses, Classification – Principles of location and clamping – Types of clamping & work holding devices, typical examples of Jigs and fixtures

TEXT BOOKS:

1. *Workshop Technology – Vol II*, B.S.Raghu Vamshi, Dhanpat Rai & Co, 10th edition, 2013
2. *Production Technology* by R.K. Jain and S.C. Gupta, Khanna Publishers, 17th edition, 2012
3. *Workshop Technology Vol II* by S.K. Hajra Chowdary, Media promoters & publishers Pvt. Ltd, 13thedition 2010.

REFERENCES:

1. *Manufacturing Technology*-Kalpakzian- Pearson education India, 5th edition 2009.
2. *Metal cutting Principles* by Milton C.Shaw, oxford Second Edn, 2nd edition, 2012
3. *Production Technology* by H.M.T. (Hindustan Machine Tools), TMH, 1st edition, 2001.
4. *Production Technology* by K.L.Narayana, IK International Publishing house Pvt Ltd 3rd revised edition 2014.



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

III B.Tech - I Semester (ME)

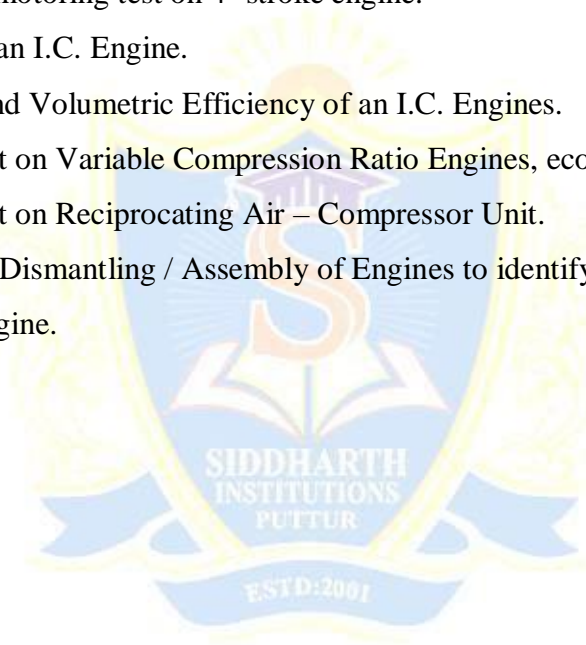
L P C

(16ME317) Thermal Engineering Lab

0 4 2

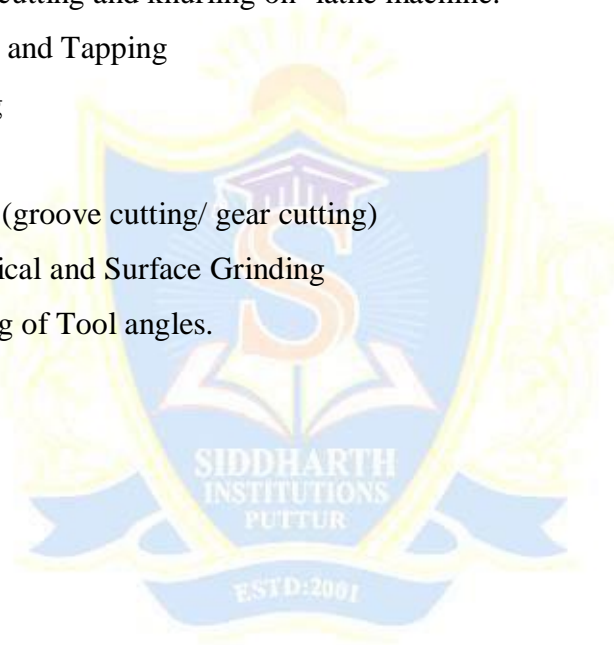
List of Experiments

1. Port timing diagram of Two stroke engine
2. Valve timing diagram of four stroke engine
3. Performance Test on a 4 -Stroke Diesel Engines.
4. Performance Test on 2-Stroke Petrol engine.
5. Retardation and motoring test on 4- stroke engine.
6. Heat Balance of an I.C. Engine.
7. Air/Fuel Ratio and Volumetric Efficiency of an I.C. Engines.
8. Performance Test on Variable Compression Ratio Engines, economical speed test.
9. Performance Test on Reciprocating Air – Compressor Unit.
10. Study of Boilers Dismantling / Assembly of Engines to identify the parts and their Position in an engine.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
(AUTONOMOUS)****III B.Tech -I Semester (ME)****L P C****(16ME318) Machine Tools Lab****0 4 2****List of Experiments**

1. Demonstration of construction & operations of general purpose machines: Lathe, Drilling machine, Milling machine, Shaper, Planning machine, slotting machine, Cylindrical Grinder, Surface grinder and Tool & cutter grinder.
2. Job on Step turning and taper turning on lathe machine.
3. Job on Thread cutting and knurling on -lathe machine.
4. Job on Drilling and Tapping
5. Job on Shaping
6. Job on Slotting
7. Job on Milling (groove cutting/ gear cutting)
8. Job on Cylindrical and Surface Grinding
9. Job on Grinding of Tool angles.



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

III B.Tech - I Semester (ME)

L T C

(16HS616) Aptitude Practice-I

3 0 0

Course Objectives:

After thorough learning of **Quantitative Aptitude and Reasoning**, a student:

1. Will be able to critically evaluate various real life situations by resorting to Analysis Of key issues and factors.
2. Will be able to read between the lines and understand various language structures..
3. Will be able to demonstrate various principles involved in solving mathematical Problems and thereby reducing the time taken for performing job functions.

UNIT – 1:

Simple equations, Ratio, Proportion, Variation

Simple Equations: Definition of Linear Equations, Formation of simple equations, Problems on Ages, Fractions and Digits, Indeterminate system of equations, Special cases in indeterminate system of equations.

Ratio and proportion: Definition of Ratio, Properties of Ratios, Comparison of Ratios, Problems on Ratios, Compound Ratio, Problems on Proportion, Mean proportional and Continued Proportion.

Variation: Direct variation, Inverse variation, Joint variation, Problems on Variations.

UNIT - II:

Percentages, Profit and loss, Partnership, Simple interest and Compound interest, Quadratic equations, and progressions

Percentages: Introduction, Converting a percentage into decimals, Converting a Decimal into a percentage, Percentage equivalent of fractions, Problems on percentages

Profit And Loss: Problems on Profit and Loss percentage, Relation between Cost Price and Selling price, Discount and Marked Price, Two different articles sold at same Cost Price, Two different articles sold at same Selling Price, Gain% / Loss% on Selling Price.

Partnership: Introduction, Relation between capitals, Period of investments and Shares

Simple Interest: Definitions, Problems on interest and amount, Problems when rate of interest and time period are numerically equal.

Compound Interest: Definition and formula for amount in compound interest, Difference between simple interest and compound interest for 2 years on the same, Principle and time period.

Quadratic equations: General form of Quadratic equations, Finding the roots of Quadratic equations, Nature of the roots, Relation between the roots, Maximum and minimum value of Quadratic Expression

Progressions: Arithmetic Progression, Geometric Progression, Harmonic Progression, Arithmetic Mean, Geometric Mean and Harmonic Mean and their relation.

SYLLABUS FOR REASONING**UNIT - III:**

Deductions: Finding the conclusions using Venn diagram method, finding the conclusions using syllogism method

Connectives: Definition of a simple statement, Definition of compound statement, finding the Implications for compound statements, finding the Negations for compound statements

UNIT - IV:

Analytical Reasoning puzzles: Problems on Linear arrangement, Problems on Circular arrangement, Problems on Double line-up, Problems on Selections, and Problems on Comparisons

UNIT - V:

Clocks: Finding the angle when the time is given, Finding the time when the angle is known, Relation between Angle, Minutes and Hours, Exceptional cases in clocks

Calendars: Definition of a Leap Year, Finding the number of Odd days, framing the year code for centuries, Finding the day of any random calendar date.

Blood relations: Defining the various relations among the members of a family, Solving Blood Relation puzzles, solving the problems on Blood Relations using symbols and notations.

TEXT BOOKS:

1. *Thorpe's verbal reasoning* GL Barrons, Mc Graw Hills., LSAT Materials
2. *'A modern approach to Logical reasoning'* R S Agarwal, S.Chand,
3. *'Quantitative Aptitude'* R S Agarwal, S Chand,
4. *Quantitative Aptitude* - G. L BARRONS
5. *Quantitative Aptitude* - Abhijit Guha Mc Graw Hills



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

III B.Tech - II Semester (ME)

L T C

(16HS605)Environmental Studies

3 0 3

Course Objectives:

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

Course Outcomes:

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

UNIT- I

Introduction: Definition, Scope and Importance-Need for Public Awareness.

Natural Resources: Classification of resources-Forest resources: Use and over-exploitation, deforestation- Mining, dams and their effects on forests and tribal people – Water resources - Use and over utilization of surface and ground water- Floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources –Energy resources: Renewable and Non-Renewable sources of energy- Solar energy, Hydro electrical energy, Wind energy, Nuclear energy, etc.

UNIT-II

Ecosystems: Concept of an ecosystem– structural features of ecosystem- Producers, Consumers and Decomposers–Biogeochemical cycles- Ecological succession-Food chains, food webs and ecological pyramids – Energy flow in the ecosystem-Types of ecosystems (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems.

UNIT-III

Biodiversity and Its Conservation:

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

UNIT-IV

Natural Disasters: Droughts, Floods, Cyclone, Landslides, Earthquake, Pollution episodes: Air pollution, Water pollution, Land pollution, Noise pollution, Automobile pollution and nuclear pollution –Effects-Global warming, Acid Rain and Ozone layer depletion and controlling measures.

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

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

UNIT-V

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

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

TEXT BOOKS:

1. *Environmental Sciences* A.Kaushik and C.P.Kaushik, , 5th edition, New age International publishers, 2015.
2. *Text Book of Environmental Science and Technology* by M.Anji Reddy, BS Publications.2012

REFERENCES:

1. *Environmental Studies* Anil Kumar and Arnab Kumar De, , New Age International Publishers, New Delhi, 3rd Edition 2015
2. *“Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”*R.K. Trivedi, Vol.I and II, Enviro Media.
3. *Environmental Studies* by Dr.K.Mukkanthi, Chand Publishers.

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

III B.Tech -II Semester (ME)

L T C

(16MB750) Managerial Economics & Financial Analysis

3 0 3

Course Objective:

The objectives of this course are to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to enrich analytical skills in helping them take sound financial decisions for achieving higher productivity

Course Outcome:

The thorough understanding of Managerial Economics and Analysis of Financial Statements facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in the challenging Business Environment.

UNIT-I

Introduction To Managerial Economics - Managerial Economics - Definition, nature and scope – contemporary importance of Managerial Economics - Demand Analysis: Determinants- Law of Demand - Elasticity of Demand. Significance –Types – measurement of elasticity of demand - Demand forecasting- factors governing demand Forecasting-methods of demand forecasting –Relationship of Managerial Economics with Financial Accounting and Management.

UNIT-II

Theory Of Production and Cost Analysis -Production Function – Short-run and long- run production - Isoquants and Isocosts, MRTS, least cost Combination of inputs - Cobb-Douglas production function - laws of returns - Internal and External Economies of scale .

Cost Analysis: Cost concepts - Break-Even Analysis (BEA) – Managerial Significance and limitations of BEA - Determination of Break Even Point (Simple Problems).

UNIT-III

Introduction to Markets and New Economic Environment - Market structures: Types of Markets - Perfect and Imperfect Competition - Features, Oligopoly -Monopolistic competition. Price-Output determination - Pricing Methods and Strategies. New Economic Environment- Economic systems – Economic Liberalization – Privatization and Globalization

UNIT-IV

Capital and Capital Budgeting - Concept of Capital - Over and under capitalization – Remedial measures - Sources of Short term and Long term capital - Estimating Working Capital requirement – Capital budgeting – Features of Capital Budgeting proposals – Methods and Evaluation of Capital budgeting – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

UNIT-V

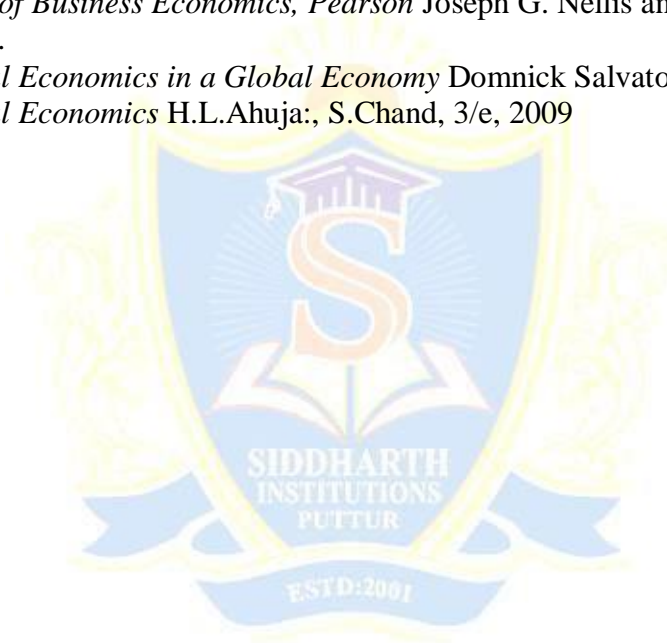
Introduction to Financial Accounting and Analysis - Financial Accounting – Concept - emerging need and importance - Double-Entry Book Keeping-Journal - Ledger – Trial Balance - Financial Statements - - Trading Account – Profit & Loss Account –Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Techniques – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

TEXT BOOKS:

1. *Managerial Economics and Financial Analysis* Aryasri:, 4/e, TMH, 2009.
2. *Managerial Economics* Varshney & Maheswari:, Sultan Chand, 2009.

REFERENCES:

1. *Financial Accounting and Analysis* Premchand Babu, Madan Mohan:, Himalaya, 2009
2. *Managerial Economics and Financial Analysis* S.A. Siddiqui and A.S. Siddiqui:, New Age International,. 2009.
3. *Principles of Business Economics*, Pearson Joseph G. Nellis and David Parker:, 2/e, New Delhi.
4. *Managerial Economics in a Global Economy* Domnick Salvatore:, Cengage, 2009.
5. *Managerial Economics* H.L.Ahuja:, S.Chand, 3/e, 2009



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

III B.Tech -II Semester (ME)

L T C

(16ME319) Design of Machine Elements-II

3 1 3

Course Educational Objectives:

- To understand the design principles of friction drives such as belt drives and gear drive such as spur, bevel, worm and helical gear drives.
- To understand the design principles of transmission system such as gear boxes.

Course Outcomes:

Students undergoing this course are able to

- Apply theoretical knowledge to design drive system equipment's including spur and helical gears, alternative drive systems, hydraulic drive systems, etc.
- Correlate theoretical knowledge with practical applications.

UNIT-I

Design of Curved Beams- Introduction, stresses in curved beams, Expression for radius of neutral axis for rectangular, circular and T-Section, Design of crane hooks, C –clamps.

Design of Power Transmissions Systems- Design of Flat belt drives, V-belt drives & rope drives. Selection of wire ropes. Design of chain drives

UNIT-II

Design of sliding contact Bearings- Types of bearings, Lubrication, Bearing Modulus, bearing materials, journal bearing Design

Design of rolling contact bearing: Design of Ball and roller bearings, Static loading of ball & roller bearings, bearing life, Failure of bearings, Design for variable loading.

UNIT-III

IC Engine Components: Cylinder, Cylinder liners, Piston materials, Forces acting on piston, Construction Design and proportions of piston,

Connecting Rod- Thrust in connecting rod, stress due to whipping action on Connecting rod ends

Crank shafts- Types, materials – Design Procedure, Bearing pressure and stress in crank shaft.

UNIT-IV

Design of Mechanical Springs– Types of springs, Stress and deflections of helical springs, coaxial springs, Energy storage capacity- Design of Helical Torsion springs, Design of Leaf springs

UNIT-V

Design of Gears: Introduction, Classification of Gears- Spur, Helical, Bevel and Worm Gears. **Spur & Helical Gears** –Force Analysis, Load concentration factor, Dynamic load factor, Surface compressive strength, Bending strength, Design analysis of spur gears, Estimation of center distance, module and face width, check for plastic deformation, Check for dynamic and wear considerations.

TEXT BOOKS:

1. *Mechanical Engineering Design*, Joseph Shigely, TMH Publishers, New Delhi,
2. *Machine Design*, R.L. Norton, Tata McGraw Hill Publishers.

REFERENCES:

1. *Machine Design*, Schaum "series, TMH Publishers, New Delhi.
2. *Design of Machine Elements*, V.B.Bhandari, and TMH Publishers, New Delhi.
3. *Machine Design*, Sadhu Singh, Khanna Publishers, New Delhi.
4. *Design of Machine Elements*, M.F.Spotts, PHI Publishers, New Delhi.
5. *Machine Design*, Pandya and Shah, Charotar Publishers, Anand.

Data Books:

- a. PSG College of Technology.
- b. Balaveera Swamy and Mahadevan.

NOTE: Design data books are permitted in the examinations.



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

III B.Tech -II Semester (ME)

L T C

(16ME320)Heat Transfer

3 1 3

Course Educational Objectives:

- *To understand the principles of conduction, convection and radiation heat transfer.*
- *To understand the applications of heat transfer in the design of heat exchangers and insulations.*

Outcomes:

Students undergoing this course are able to

- *Explain the fundamental principles associated with heat transfer phenomena and demonstrate their application in a wide range of application areas.*
- *Design and analyze heat transfer processes and equipment.*

UNIT-I

Basic Concepts – Mechanism of Heat Transfer – Conduction, Convection and Radiation.

Conduction - Fourier Law of Conduction-General Differential equation of Heat Conduction for Cartesian coordinates, cylindrical coordinates and spherical coordinates.

UNIT-II

One Dimensional Steady State Heat Conduction– Conduction through Plane Wall, Cylinders and Spherical systems – Composite Systems –Critical radius of insulation-Conduction with Internal Heat Generation.

Transient Heat conduction– Lumped Analysis – Infinite and Semi Infinite Solids. Extended Surfaces-Types of Fins, Effectiveness and Efficiency of Fins.

UNIT-III

Convection - Basic Concepts – Convective Heat Transfer Coefficients – Boundary Layer Concept – Forced Convection –Empirical correlation of forced convection- External Flow – Flow over Plates, Cylinders Spheres and Bank of tubes – Internal Flow – Free Convection – Empirical correlation of free convection, Flow over Vertical Plate, Horizontal Plate, Inclined Plate, Cylinders and Spheres.

UNIT-IV

Phase Change Heat Transfer and Heat Exchangers - Condensation -Drop wise and film wise condensation -Nusselt's theory of condensation- Boiling -Types of boiling, Regimes of pool boiling and flow boiling, correlations in boiling and condensation.

Heat Exchanger-Types - Overall Heat Transfer Coefficient – Fouling Factors - Analysis – LMTD method, NTU method.

UNIT-V

Radiation -Basic Concepts, Absorptivity, Reflectivity and Transmissivity, Laws of Radiation – Wiens Displacement Law - Stefan Boltzman Law, Kirchhoff Law, Black Body Radiation – Grey body radiation - Shape Factor – Electrical Analogy – Radiation Shields.

TEXT BOOKS:

1. *Heat & Mass Transfer* Rajput, R.K.Laxmi Publications, 3rd Edition, New Delhi, 2006.
2. *Heat Transfer* P.K. Nag, Tata Mc Graw Hill, New Delhi, 2002
3. *Heat Transfer A Practical Approach* Yunus A. Cengel,– Tata Mc Graw Hill - 2004

REFERENCES:

1. *Fundamentals of Heat and Mass Transfer* Kothadaraman, C. P., , 4th Edn, New Age International (P) Ltd., New Delhi, 1998
2. *Fundamentals of Heat and Mass Transfer* Sachdeva, R.C., , 4th Edition, New Age International (P) Ltd., New Delhi, 2012.
3. *Heat Transfer A Practical Approach* Yunus A.Cengel,– Tata McGraw Hill - 2004
4. *Fundamentals of Heat Mass Transfer* Frank P.Incropera and David P. Dewitt, , John Wiley & Sons, 1998.
5. *Heat Transfer* Ghoshdastidar, P.S,Oxford, 2004,
6. *Heat and Mass Transfer* Holman, J.P., , Tata McGraw Hill, 2000
7. *Heat Transfer* Ozisik, M.N., McGraw Hill Book Co., 1994.

Note: Heat transfer data book are allowed to the Exam.



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

L T C

III B.Tech -II Semester (ME)

3 1 3

(16ME321) CAD/CAM

Course Educational Objectives:

- *The objective of this subject is to enable the students to understand and handle design problems in symmetric manner, gain practical experience in handling 2-D drafting and 3-D modeling software systems, apply CAD in real life applications, understand the concepts G and M codes and manual part programming and know the applications of CNC machines.*

Course Outcomes:

Students undergoing this course are able to

- *Understanding the need of Group Technology as a means of bringing the benefits of mass production to relatively smaller production.*

UNIT I

Introduction of automation, Product cycle, CAD, CAM and CIM CAD Tools, CAM Tools, Utilization in an Industrial Environment, Evaluation criteria CAD standards, CAD data structure

Computer Graphics: Co-ordinate systems, Graphics package functions, 2D and 3D transformations, homogeneous transformations.

UNIT II

Geometric Modeling: Various construction methods, wire frame modeling, synthetic curves and their representations, surface modeling.

Solid modeling: solid representation, fundamentals, introduction to boundary representations, constructive solid geometry, analytical solid modeling.

UNIT III

Numerical Control: NC, NC Modes, NC Elements, NC Machine tools and their structure, Machining center, types and features. Controls in NC, CNC systems, DNC systems.

CNC Part Programming: Fundamentals, NC word, NC Nodes, canned cycles, cutter radius compensation, length compensation, computed assisted part programming using APT.

UNIT IV

FMS: Introduction, components of FMS, material handling systems, Computer control systems, advantages.

Computer Aided Quality Control: Terminology in Quality control, Inspection and testing, Contact inspection methods - optical and non-optical, integration of CAQC with CAD and CIM

UNIT V

Computer Aided Processes Planning: Retrieval type and Generative type, benefits Machinability data systems, Computer generated time standards.

Computer integrated production planning: Capacity planning, shop floor control, MRP-I, MRP-II, CIMS benefits.

TEXT BOOKS:

1. CAD/CAM, A Zimmers & P.Groover, PE, PHI
2. CAD/CAM-Principles and applications, P.N. Rao, TMH, 3rd edition, 2010

REFERENCES:

1. *Automation, Production systems & Computer integrated Manufacturing*, Groover, P.E
2. *CAD/CAM/CIM*, Radhakrishnan and Subramanian, New Age, 3rd edition, 2008
3. *Principles of Computer Aided Design and Manufacturing*, FaridAmirouche, Pearson
4. *CAD/CAM Theory and Practice*, R. Sivasubramaniam, TMH
5. *Computer Aided Design and Manufacturing*, K.Lalit Narayan, PHI, 2008.



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

III B.Tech -II Semester (ME)

L P C

0 4 2

(16HS615)Advanced English Language and Communication Skills Lab

Course Description

The introduction of the Advanced Professional Communication Skills Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their career which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context.

Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- *To improve the students' fluency in English, through a well-developed vocabulary*
- *To enable them listening spoken English at normal conversational speed by educated English speakers*
- *To respond appropriately in different socio-cultural and professional contexts.*
- *To communicate effectively and appropriately in real life situation.*
- *To develop drafting skills among the students.*
- *To develop and integrate use of the four language skills.*
- *To enhance employability skills*

UNIT-I

COMMUNICATIVE COMPETENCY:

1. Functional English(Introducing yourself & others, Making Requests, Agreeing, Disagreeing)
2. Reading Comprehension
3. Listening Comprehension
4. Vocabulary for competitive purpose

UNIT-II

TECHNICAL WRITING

1. Curriculum vitae
2. Cover Letter
3. E-mail writing

UNIT-III

PRESENTATIONAL SKILLS

1. Oral presentation
2. Power point presentation
3. Extempore – Public Speaking
4. Stage Dynamics

UNIT-IV**CORPORATE SKILLS**

1. Dress code
2. Telephonic skills
3. Net-etiquette
4. Personality Development

UNIT-V**GETTING READY FOR JOB**

1. Group Discussion
2. Interview skills
3. JAM

Outcomes

- Flair in Writing and felicity in written expression.
- To enhance job prospects.
- Improving Effective Speaking Abilities.
- To prepare effective Interview techniques.

Minimum Requirements for Advanced Professional Communication Skills 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 Info Tech Software.

REFERENCES:

1. *Effective Tech Communication*, Rizvi, Tata McGraw – Hill Education, 2007.
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. *Listening Extra*, Miles Craven, Cambridge University Press, 2008.
6. *Reading Extra*, Liz Driscoll, Cambridge University Press, 2004.
7. *Writing Extra*, Graham Palmer, Cambridge University Press, 2004.
8. *Speak Well*, Jayashree Mohan raj et al, Orient Black swan, 2013.

Mode of Evaluation: Written Examination, Day-to-day Assessment



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

III B.Tech -II Semester (ME)

L P C

0 4 2

(16ME322) Heat Transfer Lab

List of Experiments

1. Thermal conductivity of insulating powder material through Concentric Sphere apparatus.
2. Thermal conductivity of insulating material through lagged pipe apparatus
3. Overall heat transfer co-efficient through Composite Slab Apparatus
4. Thermal Conductivity of metal (conductor).
5. Heat transfer in pin-fin
6. Experiment on Transient Heat Conduction
7. Heat transfer coefficient in forced convection.
8. Heat transfer coefficient in natural convection
9. Experiment on Parallel and counter flow heat exchanger.
10. Emissivity of a gray body through Emissivity apparatus.
11. Experiment on Stefan Boltzman Apparatus.
12. Heat transfer in drop and film wise condensation.
13. Experiment on Critical Heat flux apparatus.
14. Study of heat pipe and its demonstration.
15. Study of Two – Phase flow.

Note:

1. Any 10 of the above 15 experiments are to be conducted.
2. Heat Transfer data books are permitted in the examinations

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

III B.Tech -II Semester (ME)

L P C

(16ME323) Computer Aided Design Lab

0 4 2

List of Experiments:

- I Introduction to CAD software
- II. 2D drafting using Auto CAD (Two exercises)
- III. 3D modeling using Auto CAD (Any four exercises)

Introduction to 3d modeling using AutoCAD software

1. Modeling of Component in 3D – Drawing of steps
2. Modeling of Component in 3D – Machine Elements
3. Modeling of Component in 3D – Machine Link 1
4. Modeling of Component in 3D – Machine Link 2
5. Modeling of Component in 3D – Bracket
6. Modeling of Component in 3D – Dovetail stop
7. Geometric Modeling Using Pro-E or CATIA or solid works or iron CAD (Any four exercises)
 - i) CAMERA Body
 - ii) Automobile Spring
 - iii) Assembly of Screw Jack
 - iv) Assembly of Flange Coupling

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

III B.Tech -II Semester (ME)

L T C

(16HS617) Aptitude Practice-II

3 0 0

Course Objectives:

After thorough learning of *Quantitative Aptitude and Reasoning*, a student:

1. Will be able to critically evaluate various real life situations by resorting to Analysis of key issues and factors.
2. Will be able to read between the lines and understand various language structures..
3. Will be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions

UNIT - 1:

Numbers: Classification of numbers, Divisibility rules, finding the units digit, finding remainders in divisions involving higher powers, LCM and HCF Models

Time and Distance: Relation between speed, distance and time, converting kmph into m/s and vice versa, Problems on average speed, Problems on relative speed, Problems on trains Problems on boats and streams, Problems on circular tracks, Problems on races

Time and Work: Problems on Unitary method, Relation between Men, Days, Hours and Work Problems on Man-Day-Hours method, Problems on alternate days, Problems on Pipes and Cisterns.

Averages, Mixtures and Allegations: Definition of Average, Rules of Average, Problems on Average, Problems on Weighted Average, Finding average using assumed mean method, Problems on mixtures, Allegation rule, Problems on Allegation.

UNIT - 2: Data Interpretation: Problems on tabular form, Problems on Line Graphs, Problems on Bar Graphs, And Problems on Pie Charts

Data Sufficiency: Different models in Data Sufficiency, Problems on data redundancy

Mensuration: Formulas for Areas, Formulas for Volumes of different solids, Problems on Areas, Problems on Volumes, Problems on Surface Areas

Permutation and Combinations: Definition of permutation, Problems on Permutations, Definition of Combinations, Problems on Combinations

Probability: Definition of Probability, Problems on coins, Problems on dice, Problems on Deck of cards, Problems on Years

SYLLABUS FOR REASONING

UNIT - 3:

Cubes: Basics of a cube, Formulae for finding volume and surface area of a cube, finding the minimum number of cuts when the number of identical pieces are given, Finding the maximum number of pieces when cuts are given, Problems on painted cubes of same and different colors, Problems on cuboids, Problems on painted cuboids, Problems on diagonal cuts

Venn diagrams: Representing the given data in the form of a Venn diagram, Problems on Venn diagrams with two sets, Problems on Venn diagrams with three sets, Problems on Venn diagrams with four sets

Binary Logic: Definition of a truth-teller, Definition of a liar, Definition of an alternator, solving problems using method of assumptions, solving analytical puzzles using binary logic

UNIT - 4:

Number and letter series: Difference series, Product series, Squares series, Cubes series, Alternate series, Combination series, miscellaneous series, Place values of letters

Number and Letter Analogies: Definition of Analogy, Problems on number analogy, Problems on letter analogy, Problems on verbal analogy.

Odd man out: Problems on number Odd man out, Problems on letter Odd man out, Problems on verbal Odd man out

UNIT - 5:

Coding and decoding: Coding using same set of letters, Coding using different set of letters, Coding into a number, Problems on R-model.

Direction sense: Solving problems by drawing the paths, finding the net distance travelled, finding the direction, Problems on clocks, Problems on shadows, Problems on damaged compass, Problems on direction sense using symbols and notations.

Critical Reasoning: Problems on assumption, Problems on conclusions, Problems on inferences, Problems on strengthening and weakening of arguments, Problems on principle, Problems on paradox.

Lateral reasoning puzzle: Problems on common balance, Problems on digital balance, Problems on coins, Problems on lockers, Problems on heights, Digit puzzles using basic arithmetic operations

TEXT BOOKS:

1. *Thorpe's verbal reasoning* GL Barrons, Mc Graw Hills, , LSAT Materials
2. *'A modern approach to Logical reasoning'* R S Agarwal, S.Chand,
3. *'Quantitative Aptitude'* R S Agarwal, S Chand,
4. *Quantitative Aptitude* - G. L BARRONS
5. *Quantitative Aptitude* - Abhijit Guha Mc Graw Hills

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

IV B.Tech-I Semester (ME)

L T C

(16MB751) Entrepreneurship Development

3 1 3

Course Educational Objectives:

- *To develop and strengthen entrepreneurial quality and motivation in students and to impart basic entrepreneurial skills and understanding to run a business efficiently and effectively*

Course Outcomes:

Students undergoing this course are able to

- *Upon completion of the course, students will be able to gain knowledge and skills needed to run a business successfully.*

UNIT-I

Introduction to Entrepreneurship - Concept of Entrepreneur's, Enterprise and Entrepreneurship; Characteristics, Qualities, Functions of entrepreneur and Advantages of Entrepreneurship; Role of entrepreneurship in Economic development, Challenges faced by entrepreneurs, Entrepreneurial scenario in India and Abroad; Elements of Social Entrepreneurship, Types of Entrepreneurs, Entrepreneurship vs. Intrapreneurship.

UNIT-II

Small Business and its Importance - Introduction, Need, Classification of Micro, Small and Medium Enterprises (MSMEs), Role of MSMEs, Problems of MSMEs, Steps for Starting MSMEs, The role of government in supporting MSMEs in India.

Forms of Business Organization: Evaluation of Form of Business organization: Sole Proprietorship, Partnership, Joint Hindu Family, Joint Stock Company and Co-operative Society. Special forms of business ownership: Licensing, Franchising and Leasing.

UNIT-III

Innovation and Idea Generation in Entrepreneurship - Concept of Invention and Innovation, types of innovation, Sources of Innovation, Importance of Innovation in Entrepreneurship. Sources of new ideas, Methods of generating ideas and Opportunity recognition and idea generation in entrepreneurship. Intellectual Property Rights (IPRs): Patents, trademarks, copyrights, and trade secrets. E-commerce and Business Start-ups, Sources of information for Start-up Entrepreneurs in India. Problems of Start-ups without IPRs.

UNIT-IV

Entrepreneurial Motivation - Concept of Motivation and Factors influencing the entrepreneurs; Motivational Theories-Maslow's Need Hierarchy Theory, McClelland's Acquired Need Theory. Entrepreneurship Development Programs (EDPs) - Need and Role of EDPs. Opportunities for entrepreneurship in present scenario. Successful entrepreneurs.

Financing of Enterprises - Source of financing - Debt capital, seed capital, venture capital, Loans available for starting ventures in India, Role of government agencies in small business financing. Role of consultancy organizations.

UNIT-V

Project Planning and Feasibility Study - Meaning of Project, Project Life Cycle, and Stages of Planning Process. Project Planning and Feasibility, Project proposal and report preparation.

TEXT BOOKS:

1. *Entrepreneurship*, 8/e, Robert D Hisrich, Mathew J.Manimala, Michael P Peters, Dean A.Shepherd, McGraw Hill Education.
2. *The Dynamics of Entrepreneurial Development and Management*, Vasanth Desai, Himalaya Publishing House, Mumbai.

REFERENCES:

1. *Entrepreneurial Development*, S.S. Khanka, S. Chand and Company Limited.,
2. *Fundamentals of Entrepreneurship*, H. Nandan, PHI.
3. *Entrepreneurship Management – text and cases*, Bholanath Dutta, Excel Books.
4. *Entrepreneurship – New venture Creation*, Holt, and PHI.
5. *Entrepreneurial Development*, Ramachandran, Tata McGraw Hill, New Delhi.
6. *Entrepreneurial Development*, Gupta and Srinivasan, S Chand & Sons, New Delhi.



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

IV B.Tech-I Semester (ME)

L T C

3 1 3

(16ME324) Operations Research

Course Educational Objectives:

- To provide knowledge and training in using optimization techniques under limited resources for the engineering and business problems

Course Outcomes:

Students undergoing this course are able to

- Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems

UNIT-I

Introduction to OR and Linear Programming-OR definition– Classification of Models – Types of Operations Research models; Linear Programming- Problem Formulation, Graphical Method, Simplex Method, Big-M Method, Duality, Dual Simplex Method- Degeneracy.

UNIT-II

Transportation Problem – Formulation; Different Methods of Obtaining Initial Basic Feasible Solution-North-West Corner Rule, Least Cost Method, Vogel's Approximation Method Modified Distribution (MODI) Method, Unbalanced Transportation Problem, Degenerate Problem.

Assignment Problem – Formulation, Optimal Solution -Traveling Salesman problem.

UNIT-III

Game Theory - Introduction – Minimax (Maximin) Criterion and Optimal Strategy, Saddle Point, Solution of Games with Pure Strategy –Games with Mixed Strategies – 2 X 2 Games – Dominance Principle– Solution by Graphical Method of m X 2 & 2 X n games.

Queuing Theory- Introduction –Terminology, Service Channel, Arrival Pattern, Population, Departure Pattern(Service Pattern), Queue Discipline, Birth & Death Process, Balking, Reneging, Jockeying; Single Channel Models with Poisson Arrivals, Exponential Service Times with finite queue length and non-finite queue length; Multichannel Models with Poisson Arrivals, Exponential Service Times with finite queue length and nonfinite queue length.

UNIT-IV

Sequencing -Assumptions-n-jobs x 2 Machines model, n-jobs x 3 machines models.

PERT & CPM: Introduction to Project Management, Activities, Events, Predecessor Relationships, AOA Diagram, Early Start, Early Finish, Late Start & Late Finish Times, Earliest Occurrence and Latest Occurrence of the Event, Total Float, Free Float, Independent Float CPM- Deterministic Model- Critical Path, Crashing, Optimal Project Duration, Least Possible Project Duration ,PERT- Probabilistic Model- Various types of Activity Time Estimates, Standard Deviation and Variance of the Activities and Projects, and Probability of Completing the Project within scheduled time.

UNIT-V

Dynamic Programming - Introduction – Bellman’s Principle of Optimality – Applications of Dynamic Programming- Capital Budgeting Problem – Shortest Path Problem.

Introduction to maintenance– Types of Maintenance, Types of Replacement Problem, Determination of Economic Life of an Asset, and Simple Probabilistic Model for Items which completely fail-Individual Replacement Model, Group Replacement Model.

TEXT BOOKS:

1. *Operations Research* by R Panneerselvam, PHI, 2nd edition, 2012.
2. *Operations Research* by Manohar Mahajan Dhanpat Rai & Co

REFERENCES:

1. *Operations Research* by S P SHARMA
2. *Operations Research* by Er. Prem kumar Guptha & Dr.D.S. Hira



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

IV B.Tech-I Semester (ME)

L T C

3 1 3

(16ME325) Refrigeration & Air Conditioning

Course Educational Objectives:

- To understand the underlying principles of operations in different Refrigeration & Air conditioning systems and components.
- To provide knowledge on design aspects of Refrigeration & Air conditioning systems

Course Outcomes:

Students undergoing this course are able to

- Upon completion of this course, the students can able to demonstrate the operations in different Refrigeration & Air conditioning systems and also able to design Refrigeration & Air conditioning systems.

UNIT-I

Introduction - Introduction to Refrigeration - Unit of Refrigeration and C.O.P. – Ideal cycles, Necessity & Applications of Refrigeration, Types of Air Refrigeration Systems, Problems.

UNIT-II

Vapour Compression Refrigeration System– Working principle and essential components of VCR system. Vapor compression cycle: P-h and T-S diagrams - deviations from theoretical cycle – sub cooling and super heating, problems

Refrigerants- Desired properties- Environmental issues- Refrigerant Mixtures- Zeotropic & Azeotropic mixtures - Cascade systems & Applications.

UNIT-III

Other Refrigeration Systems: Vapour absorption system –Electrolux, Two fluid and Three fluid System, Steam jet refrigeration- Thermoelectric refrigeration- Vortex tube refrigeration systems.

UNIT-IV

Introduction to Air Conditioning -Psychrometric Properties and Processes-Psychrometric chart & Construction, Need for ventilation and Infiltration – concepts of RSHF, GSHF, ERSHF and ADP, Air conditioning loads, Problems.

UNIT-V

Air Conditioning Systems and Distribution of Air–Human comfort, effective temperature & Comfort chart, classifications of Air Conditioning Systems- summer, winter & all year round air conditioning, problems, classification of Ducts, Methods of Duct Design – Grills and Registers.

TEXT BOOKS:

1. *"Refrigeration and Air conditioning"*, C.P.Arora & Domkundwar, 3rd edition, McGraw Hill, New Delhi, 2010.
2. *"Refrigeration and Air conditioning"*, R.S.Khurmi., any revised edition, S.Chand Publishers.

REFERENCES:

1. *"Principles of Refrigeration"*, Roy J. Dossat, 4th edition, Pearson Education Asia, 2009.
2. *"Refrigeration and Air Conditioning"*, Stoecker, W.F. and Jones J. W., McGraw Hill, New Delhi, 1986.
3. ASHRAE Hand book, Fundamentals, 2010
4. *"Air conditioning engineering"*, Jones W.P., 5th edition, Elsevier Butterworth-Heinemann, 2001



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

IV B.Tech-I Semester (ME)

L T C

(16ME326) Metrology & Measurements

3 0 3

Course Educational Objectives:

- *Understand the Limits and Fits, linear measurements and angular measurements, gauges, comparators, optical measuring methods, measurement of flatness and roughness of surface. And also learn about the screw thread and gear measuring methods, Alignment tests on machine tools.*
- *Understand various transducers to measure displacement like Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers and also learn about Calibration procedure, temperature and pressure calibration methods, and the measurement of flow stress, strain measurements acceleration and vibration.*

Course Outcomes:

Students undergoing this course are able to

- *Understand the Limits, Fits and Tolerance, Know the principle of working of the most commonly used instruments for measuring linear and angular distances.*
- *Understand working of various instruments used for measuring for displacement, temperature and pressure, speed, stress, strain vibration.*

UNIT-I

LIMITS, FITS and TOLERNCES: Introduction, Definitions, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly. Indian standard system – International Standard organization system for plain work.

LIMIT GAUGES and GAUGE DESIGN: Plug Ring, Snap, Gap, Taper gauges. Taylor's principle, Go and No Go gauges.

UNIT-II

LINEAR MEASUREMENT: Slip gauges – calibration, Dial indicator, micrometers, vernier height gauges.

MEASUREMENT OF ANGLES AND TAPERS: Different methods – Bevel protractor – angle gauges – spirit levels – sine bar – Sine plate, rollers and spheres used to determine the tapers.

SURFACE MEASUREMENT: Surface roughness, Surface waviness- Assessment of surface finish – CLA, R.M.S Values – R_a , R_z values, Profilo graph, Talysurf, BIS symbols for indication of surface finish auto collimators, interferometer and their uses.

UNIT-III

SCREW THREAD MEASUREMENT: Elements – errors in screw threads – measurement of effective diameter, angle of thread and thread pitch- profile thread gauges.

GEAR MEASUREMENT: Gear measuring instruments, Gear tooth profile measurement. Measurement of diameter, pitch, tooth thickness.

MACHINE TOOL ALIGNMENT TESTS: Requirements of Machine Tool Alignment Tests, Alignment tests on lathe, milling and drilling machine tools.

UNIT-IV

MEASUREMENT OF DISPLACEMENT: Theory and construction of various transducers to measure displacement - Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers, simple problems.

MEASUREMENT OF SPEED: Mechanical Tachometers - Electrical tachometers - Stroboscope, Noncontact type of tachometer, simple problems .

STRESS & STRAIN MEASUREMENTS: Various types - electrical strain gauge - gauge factor - method of usage of resistance strain gauge for bending, compressive and tensile strains - usage for measuring torque, Strain gauge Rosettes, simple problems.

MEASUREMENT OF ACCELERATION: Different simple instruments - Principles of Seismic instruments, simple problems.

UNIT-V

MEASUREMENT OF TEMPERATURE: Standards and calibration, thermal expansion methods, thermo electric sensors (thermocouples), Electrical Resistance sensors, Junction semiconductor sensors, Digital thermometers, Radiation methods, simple problems.

MEASUREMENT OF PRESSURE: Standards and calibration, basic methods of pressure measurement, dead weight gauges and manometers, Elastic transducers, vibrating cylinder, resonant transducers, High and low pressure measurement, simple problems.

MEASUREMENT OF FORCE, TORQUE, POWER: Standards and calibration, Basic methods of Force Measurement, Torque measurement on rotating shafts, shaft power measurement (dynamometers) , simple problems.

TEXT BOOKS:

1. *Mechanical Measurements* ,Beckwith, Marangoni, Line hard, PHI, PE
2. *Measurement systems: Application and design*, Doeblin Earnest. O. Adaptation by Manik and Dhanesh, TMH, 2012.
3. *Engineering Metrology*, R.K. Jain, Khanna Publishers, 20th edition, 2013.

REFERENCES:

1. *Engineering Metrology*, Mahajan, DhanpatRai, 2nd edition, 2013.
2. *BIS standards on Limits & Fits*
3. *Fundamentals of Dimensional Metrology*, ConnieDotson, 4e, Thomson
4. *Metrology & Measurement* by Anand K Bewoor, vinay A kulkarni, Mc GrawHill, 2013.
5. *Instrumentation, measurement & analysis*, B.C.Nakra & KKChoudhary, TMH, 6th Edition , 2011.

Web REFERENCES: <http://emtool box.nist.gov>

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

IV B.Tech-I Semester (ME)

L P C

(16ME330) Metrology and Measurements Lab

0 3 2

Course Educational Objectives:

- *To understand by conducting experiments, (i) the linear and angular measurements and calibration (ii) the measurements of displacement, force, torque, temperature and vibration (iii) checking the limits of dimensional tolerance.*

Course Outcomes:

Students undergoing this course are able to

- *Design of measurement experiments to measure various parameters and correlate with theoretical knowledge.*
- *Ability to report the results of a laboratory experiment in written, oral & graphical manner.*

LIST OF EXPERIMENTS

1. Calibration of linear measuring instruments
2. Calibration of angle measuring instruments
3. Measurement of Taper Angle
4. Measurement of straightness and flatness
5. Measurement of thread parameters
6. Measurements of Gear Tooth Dimensions
7. Calibration of the limits of dimensional tolerances using comparators
8. Measurement of Temperature
9. Measurement of Displacement
10. Measurement of Force
11. Measurement of Torque
12. Measurement of Vibration

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
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IV B.Tech-I Semester (ME)

L P C

0 3 2

(16ME331) Computer Aided Engineering Lab

LIST OF EXPERIMENTS

INTRODUCTION TO ANSYS

Structural Analysis

- 1) Truss Member
- 2) Simply Supported Beam
- 3) Plate with hole
- 4) Taper Cross Section

Thermal Analysis

- 1) Conductive Heat Transfer Analysis in Rectangular 2D Component.
- 2) Conductive Heat Transfer Analysis in Different Geometry 2D Components

Mat Lab

- 1) Construct Perceptron, train and test the performance
- 2) Construct Back Propagation Network, train and test the performance
- 3) Construct Radial Basis Function Network, train and test the performance
- 4) Build fuzzy logic membership functions through MATLAB tool box

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

IV B.Tech-I Semester (ME)

L T C

**(Department Elective –I)
(16ME327) Finite Element Methods**

3 1 3

Course Educational Objectives:

- *To understand the basic matrix operation to form a global matrix equation and enforce the concept of steps in obtaining solutions for a 1-D and 2-D structures.*

Course Outcomes:

Students undergoing this course are able to

- *Use finite element software to stimulate physical behaviors of Mechanical structures.*
- *Apply FEA principles for components and assembly design*

UNIT-I

INTRODUCTION TO FEM : Basic concepts, historical background, application of FEM, general procedure for FEA, preprocessing and post processing, Discretization, stresses and Equilibrium, Strain-Displacement relations, Stress-Strain relations, Plain stress, Plain strain problems.

SHAPE FUNCTIONS: Coordinates and polynomial shape function, Quadratic shape functions, properties of shape function

UNIT-II

FINITE ELEMENT MODELLING: The potential energy approach, minimum potential energy, Galerkin approach. The Rayleigh-Ritz method. Stiffness matrices spring and bar elements.

1 D PROBLEMS: Stiffness matrix for bar element, global stiffness matrix and load vector, the finite element equations, treatment of boundary conditions examples of axially loaded members.

UNIT-III

ANALYSIS OF PLAIN TRUSSES: Introduction, plane trusses, local and global co-ordinate system, element stiffness matrix, stress calculations, examples of plane truss with 3 members.

BEAMS AND FRAMES: Element matrices, assembling of global stiffness matrix, Solution for displacements, reactions, stresses.

UNIT-IV

2D PROBLEMS: Finite element modeling of two dimensional stress analysis with CST elements and treatment of boundary conditions. Finite element modeling of axisymmetric solids subjected to Axisymmetric loading with triangular elements.

UNIT-V

STEADY STATE HEAT TRANSFER ANALYSIS: One dimensional analysis of a Fin and two dimensional analysis of thin Plate. Analysis of a uniform shaft subjected to a Torsion.

DYNAMIC ANALYSIS: Formulation of finite element model, element matrices, evaluation of Eigen values and Eigen vectors for stepped bar and a beam.

TEXT BOOKS:

1. “*An Introduction to the Finite Element Method*”, Reddy. J.N., 3rd Edition, Tata McGraw-Hill, 2005
2. “*Text Book of Finite Element Analysis*”, Seshu, P, Prentice-Hall of India Pvt. Ltd., New Delhi, 2007.

REFERENCES:

1. “*The Finite Element Method in Engineering*”, Rao, S.S., 3rd Edition, Butterworth Heinemann, 2004
2. “*A first course in Finite Element Method*”, Logan, D.L., Thomson Asia Pvt. Ltd., 2002
3. “*Concepts and Applications of Finite Element Analysis*”, Robert D. Cook, David S. Malkus, Michael E. Plesha, Robert J. Witt, 4th Edition, Wiley Student Edition, 2002.
4. “*Introduction to Finite Elements in Engineering*”, Chandrupatla & Belagundu, 3rd Edition, Prentice Hall College Div, 1990
5. “*Fundamental Finite Element Analysis and Applications*”, Bhatti Asghar M, John Wiley & Sons, 2005 (Indian Reprint 2013)



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

IV B.Tech-I Semester (ME)

L T C

3 1 3

(Department Elective –I)

(16ME328) Quality Control and Reliability Engineering

Course Educational Objectives:

- To introduce the concept of SQC
- To understand process control and acceptance sampling procedure and their application.
- To learn the concept of reliability

Course Outcomes:

Students undergoing this course are able to

- Upon successful completion of this course, the students can able to apply the concept of SQC in process control for reliable component production

UNIT-I

Introduction And Process Control For Variables -Introduction, definition of quality, basic concept of quality, definition of SQC, benefits and limitation of SQC, Quality assurance, Quality control: Quality cost-Variation in process causes of variation –Theory of control chart- uses of control chart – Control chart for variables – X chart, R chart process capability – process capability studies and simple problems. Six sigma concepts

UNIT-II

Process Control For Attributes-Control chart for attributes –control chart for non-conforming– p chart and np chart – control chart for nonconformities– C and U charts, State of control and process out of control identification in charts, pattern study.

UNIT-III

Acceptance Sampling-Lot by lot sampling – types – probability of acceptance in single, double, multiple sampling techniques- O.C. curves – producer's Risk and consumer's Risk. AQL, LTPD, AOQL concepts-standard sampling plans for AQL and LTPD uses.

UNIT-IV

Life Testing – Reliability -Life testing – Objective and its concept of reliability – failure data analysis, Mean failure rate, mean time to failure, mean time between failure, hazard rate – Weibull model, Bath Tua Curuce, system reliability, series, parallel and mixed configuration – simple problems. Maintainability and availability – simple problems.

UNIT-V

Quality And Reliability-Reliability improvements – techniques- use of Pareto analysis – design for reliability – redundancy unit and standby redundancy – Optimization in reliability – Scatter diagram, Ishikama diagram.

Note: Use of approved statistical table permitted in the examination.

TEXT BOOKS:

1. “*Introduction to Statistical quality control*”, Douglas.C. Montgomery, 4th edition, John Wiley 2001.
2. “*Reliability Engineering*”, Srinath. L.S., Affiliated East west press, 1991.

REFERENCES:

1. “*Statistical process control*”, John.S. Oakland. 5th edition, Elsevier, 2005
2. “*Practical Reliability Engineering*”, Connor, P.D.T.O., John Wiley, 1993
3. “*Statistical Quality Control*”, Grant, Eugene .L McGraw-Hill, 1996
4. “*Statistical Quality Control*”, Monohar Mahajan, Dhanpat Rai & Sons, 2001.
5. “*Quality assurance & TQM*”- Jain K.C & Chirale. A. K-Khanna Publishers, 1998.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
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IV B.Tech-I Semester (ME)

L T C

3 1 3

**(Department Elective –I)
(16ME329) Metal Forming Process**

Course Educational Objectives:

Metal forming processes are highly nonlinear because they involve geometric, material and contact non linearity. And so this subject introduce the concepts of one, two and three dimensional stress analysis, theory of plasticity, strain hardening, hot and cold working process. The students also will get the awareness on various types of rolling mills, forgings, extrusions, wire drawing processes, sheet metal operations, concepts on plastic manufacturing processes and rapid manufacturing process and its applications.

Course Outcomes:

Students undergoing this course are able to

- *Upon successful completion of this course, the students can able to know the concept of stress and strain analysis in 2D and 3D, rolling and Forging processes. And also the student must able to understand the Extrusion process, sheet metal working and Process of plastics.*

UNIT-I

Stress, strain, Two dimensional stress analysis and three dimensional stress analysis, relation between engineering stress and true stress, relation between engineering strain and true strain, yield criteria, yield locus, theory of plasticity, Hot working, cold working, strain hardening, recovery, recrystallization and grain growth, Comparison of properties of Cold and Hot worked parts

UNIT-II

ROLLING: Bulk deformation processes – Economics of bulk forming, principles and theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements, applications and, limitations, defects in rolled products.

FORGING PROCESSES: Principles of forging –Types Forging – Smith forging, Drop Forging – Roll forging – Forging hammers: Rotary forging – forging defects, Forces in forging of strip, disc and power requirements, applications.

UNIT-III

EXTRUSION PROCESSES: Basic extrusion process and its characteristics. Mechanics of hot and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion Hydrostatic extrusion, forces in extrusion of cylindrical and non-cylindrical components – characteristics and defects in extruded parts.

WIRE DRAWING: Process Mechanics and its characteristics, determination of degree of drawing, drawing force, power, and number of stages-defects in products.

UNIT-IV

Sheet Metal Working – Economic Considerations - Stamping, forming and other cold working processes: Blanking and piercing – Bending and forming – Drawing and its types – Cup drawing and Tube drawing – coining – Hot and cold spinning. Force and power requirement in sheet metal operations, defects in sheet metal products.

UNIT-V

Processing of plastics, injection and blow moulding, calendaring, thermo forming, compression moulding, transfer moulding, High energy rate forming methods.

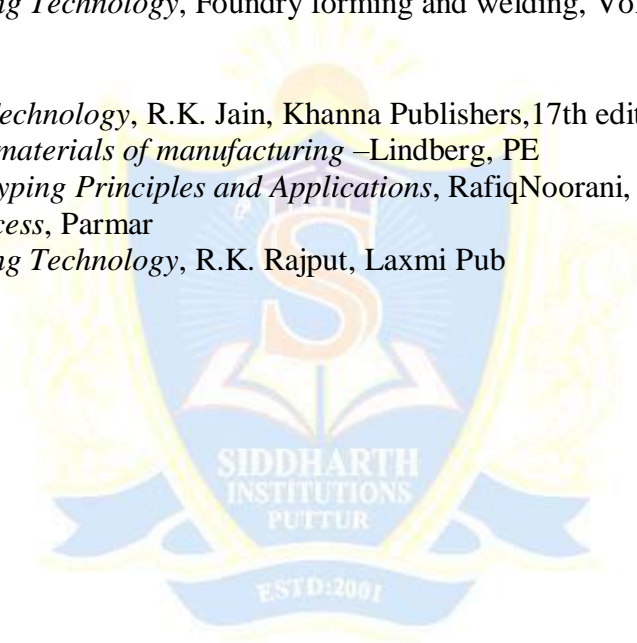
RAPID MANUFACTURING: - Introduction – concepts of rapid manufacturing, information flow for rapid prototyping, classification of rapid prototyping process, stereolithography fused deposition modeling, selective laser sintering, Applications of rapid prototyping process.

TEXT BOOKS:

1. *Manufacturing Technology*, Schmid and Kalpakjian, Pearson Education.
2. *Manufacturing Technology*, Foundry forming and welding, Vol I, P.N.Rao, TMH

REFERENCES:

1. *Production Technology*, R.K. Jain, Khanna Publishers, 17th edition, 2012
2. *Process and materials of manufacturing* – Lindberg, PE
3. *Rapid Prototyping Principles and Applications*, Rafiq Noorani, Wiley Pub.
4. *Welding Process*, Parmar
5. *Manufacturing Technology*, R.K. Rajput, Laxmi Pub



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

IV B.Tech-II Semester (ME)

L T C

(16ME332) Mechatronics

3 1 3

Course Educational Objectives:

- To understand the components of mechatronics systems and applications
- To understand the Electrical actuators and PLC in Automation

Course Outcomes:

Students undergoing this course are able to

- Understanding of mechatronic design principles, instrumentation and interfaces, sensors, actuators and the integration of control systems.
- Knowledge of state-of-the-art developments in mechatronics.

UNIT-I

Introduction- Definition- Trends- Components, Control Methods Real Time operating system, Graphical User Interface, Simulation, Applications: SPM, Robot, CNC, FMS, CIM.

UNIT-II

Signal Conditioning - Introduction- Hardware- Digital I/O, Analog Input- ADC, Resolution, Resistors, capacitors- Amplifying Signals using OP Amps- Digital signal Processing – low pass, high pass, notch filtering, Analog interfacing & Digital interfacing, DAC, ADC.

UNIT-III

Precision Mechanical Systems- Introduction- Actuation Types, Mechanical Actuation Systems- Electrical Actuation systems, Pneumatic Actuation Systems- Electro Pneumatic Actuation systems, Hydraulic Actuation systems- Electro Hydraulic actuation systems , - Timing Belts.

UNIT-IV

Electronic Interface Subsystems -Motor Isolation Schemes- coupling; buffer ICs- Protection schemes- circuit breakers, over current sensing, resettable fuses, and power supply – bipolar transistors / mosfets.

Electromechanical Drives: Relays and Solenoids- Stepper motors- DC brushed motors- DC brushless motors- DC servo motors –PWMs- Pulse Width Modulation.

UNIT-V

Microcontrollers Overview:-8051 Microcontroller, microprocessor structure- applications

Programmable Logic Controllers:-Basic Structure- programming: Ladder diagram- Timers, Internal Relays and Counters – Shift registers- Master and Jump Controls- Data handling- PLC Selections, Applications.

TEXT BOOKS:

1. “Mechatronics, Electronic Control Systems in Mechanical and Electrical Engineering”, W.Bolton, Pearson Education, 2011.
2. “Mechatronics Integrated mechanical Electronic System” K.P. Ramachandran wiley India Pvt Ltd, New Delhi,2008

REFERENCES:

1. *“Mechatronics”* R.V. Rajput S. Chand Publishers, 2007.
2. *Automation with Programmable Logic Controllers*, Rohner, P., Macmillan / McGraw Hill, New York, 1996.
3. *Automatic Manufacturing Systems Actuators, Controls and Sensors*, Brian Morris, McGraw Hill, New York, 1994.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
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IV B.Tech-II Semester (ME)

L T C

3 1 3

**(Department Elective –II)
(16ME333) Power Plant Engineering**

Course Educational Objectives:

To make the students understand the importance of energy and constructional features and procedure of various types of power plants.

Course Outcomes:

Students undergoing this course are able to

- *After completion of this course students are able to understand the various types of Renewable energy sources and working of Steam power plant. Student also knows the working principle of diesel Power plant and Hydroelectric power plant.*

UNIT-I

Introduction to the Sources of Energy – Resources and Development of Power in India. Layouts of Steam, Hydel, Diesel, MHD, Nuclear and Gas Turbine Power Plants - Combined Power Cycles - Comparison and Selection, Power Plant Economics and Environmental Considerations: Capital Cost, Investment of Fixed Charges, Operating Costs
General Arrangement of Power Distribution, Load Curves, and Load Duration Curve. Definitions of Connected Load, Maximum Demand, Demand Factor, Average Load, Load Factor, and Diversity Factor – Tariff - Related Exercises. Effluents from Power Plants and Impact on Environment –Pollutants and Pollution Standards – Methods of Pollution Control. Inspection and Safety Regulations.

UNIT-II

Steam power plant: Modern High Pressure and Supercritical Boilers, Analysis of Power Plant Cycles - Modern Trends in Cycle Improvement ,Fuel Handling Equipment- Types of Coals, Coal Handling, Coal Storage, Ash Handling Systems.

Combustion and Combustors: Theoretical air requirements- Properties of Coal – Overfeed and Under Feed Fuel Beds, Stoker fired boiler, Pulverized Fuel Burning System and Its Components, Combustion Needs and Draught System, Cyclone Furnace- Design and Construction, Dust Collectors, Cooling Towers and Heat Rejection. Measurement of pollutants and their analysis.

UNIT-III

Diesel Power Plant: Diesel Power Plant: Introduction – IC Engines, Types, Construction– Plant Layout with Auxiliaries – Fuel Storage, Heat balance-Supercharging

Gas Turbine Plant: Introduction – Classification - Construction – Layout with Auxiliaries – Principles of Working Closed and Open Cycle Gas Turbines, intercooling, Reheating & Regenerating, Advantages And Disadvantages Combined Cycle Power Plants.

UNIT-IV

Hydro Electric Power Plant: Water Power – Hydrological Cycle / Flow Measurement – Drainage Area Characteristics – Hydrographs – Storage and Pondage – Classification of Dams and Spill Ways.

Hydro Projects and Plant: Classification – Typical Layouts – Plant Auxiliaries – Plant Operation Pumped Storage Plants, Selection of Prime movers, Governing of Turbines

UNIT-V

Nuclear Power Station: Nuclear Fuel – Nuclear Fission, Chain Reaction, Breeding and Fertile Materials – Nuclear Reactor – Reactor Operation.

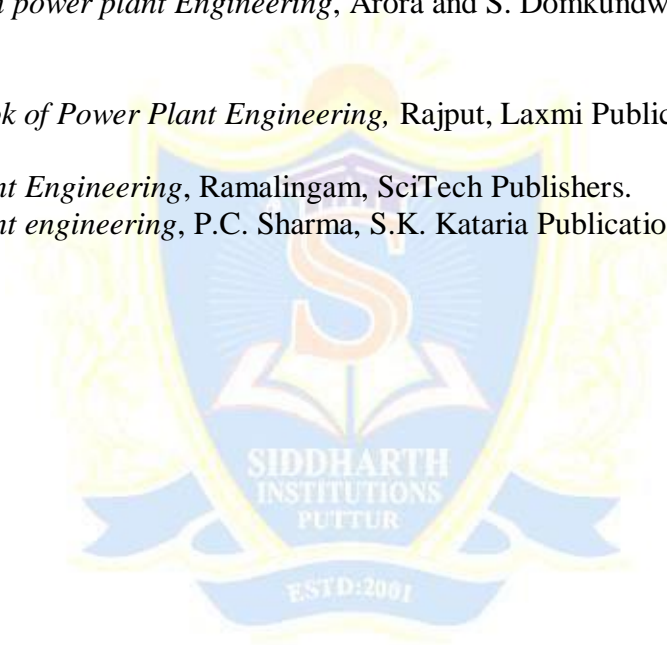
Types of Reactors: Pressurized Water Reactor, Boiling Water Reactor, Sodium-Graphite Reactor, Fast breeder Reactor, Homogeneous Reactor, Gas Cooled Reactor, Radiation Hazards and Shielding – Radioactive Waste Disposal.

TEXT BOOKS:

1. *Power plant Engineering*, P.K. Nag, TMH, 3rd edition, 2013.
2. *A course in power plant Engineering*, Arora and S. Domkundwar.

REFERENCES:

1. *A Text Book of Power Plant Engineering*, Rajput, Laxmi Publications, 4th edition, 2012..
2. *Power plant Engineering*, Ramalingam, SciTech Publishers.
3. *Power plant engineering*, P.C. Sharma, S.K. Kataria Publications, 2012



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

IV B.Tech-II Semester (ME)

L T C

**(Department Elective –II)
(16ME334) Production and Operation Management**

3 1 3

UNIT-I

Functions of Production Planning & Controls operations & productivity, productivity measurement, Design of goods and services: selection, generating new products, product development, issues in product design. Types of planning-Aggregates planning, Chase planning and expediting.

UNIT-II

Forecasting – Importance of forecasting – Types of forecasting, their uses – General Principles of forecasting – Forecasting techniques – Qualitative methods and Quantitative methods – Accuracy of forecasting methods, MAPE, MAD, MSE etc.

UNIT-III

Factors affecting facilities location, mathematical models for facilities, location, Types of facilities-layout: product layout, process layout, group technology layout, Assembly line balancing, computerized layout: ALDEP, CRAFT, and CORELAP(Only Basics).

UNIT-IV

Lean Management, philosophy and creation of lean enterprise, JIT concepts-Kanban System. Elements of total quality management, Six Sigma Quality Control, MRP. Lot sizing techniques in MRP, ERP, LOB (Line of Balance).

UNIT-V

Scheduling Policies – Techniques & Problems, flow shop and job shop Scheduling techniques.

Inventory management – Functions of inventories – relevant inventory costs – ABC analysis – VED analysis, EOQ model – Inventory control systems – P-Systems and Q-Systems-(S, s) Policy.

TEXT BOOKS:

1. *Modern Production, Operations Management*, Baffa&RakeshSarin.
2. *Operation Management* by B. Mahadevan, PearsonEdu.
3. *Operation and O.M* by Adam & Ebert- PHI Pub.,

REFERENCES:

1. *Operations Management* – S.N. Chary.
2. *Inventory Control Theory and Practice*, Martin K. Starr and David W. Miller.
3. *Production Control A Quantitative Approach*, John E. Biegel.
4. *Production Control*, Moore.
5. *Operations Management*, Joseph Monks.
6. *Production and Operation management*, R.Panneerselvam PHL Learning-II Edition-2005.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
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IV B.Tech-II Semester (ME)

L T C

**(Department Elective –II)
(16ME335) Modern Manufacturing Methods**

3 1 3

Course Educational Objectives:

- To make the students to understand the advanced manufacturing techniques evolved in manufacturing scenario.
- To learn about the advanced manufacturing techniques *USM, AJM, ECM, CM, EDM, PM, EBM, LSB,*

Course Outcomes:

Students undergoing this course are able to

- *After completion of this unit students are able to understand and it's the applications of electron beam and laser beam in manufacturing environment, accuracy, machining speed and etc., with respect to all non-traditional machining processes.*

UNIT-I

Need for Modern Manufacturing Methods- Non-traditional machining methods and rapid prototyping methods - their relevance for precision and lean manufacturing. Classification of non-traditional processes - their selection for processing of different materials and the range of applications.

Additive Manufacturing - Classification of rapid prototyping methods - sterolithography, fused deposition methods - materials, principle of prototyping and various applications.

UNIT-II

Ultrasonic machining – Elements of the process, mechanics of material removal, process parameters, applications and limitations.

Water Jet Machining- Abrasive jet, Water jet and abrasive water jet machining: Basic mechanics of material removal, descriptive of equipment, process variables, applications and limitations.

UNIT-III

Electro – Chemical Processes- Fundamentals of electro chemical machining, electrochemical grinding, and metal removal rate in ECM, Tooling, process variables, applications, economic aspects of ECM. Chemical Machining: Fundamentals of chemical machining- Principle of material removal- maskants – etchants- process variables, advantages and applications.

UNIT-IV

Thermal Metal Removal Processes- Basic principle of spark erosion (EDM), Wire cut EDM, and Electric Discharge Grinding processes - Mechanics of machining, process parameters, selection of tool electrode and dielectric fluids, choice of parameters for improved surface finish and machining accuracy - Applications of different processes and their limitations.

UNIT-V

Electron Beam Machining- Generation and control of electron beam for machining, theory of electron beam machining, comparison of thermal and non-thermal processes - process mechanics, parameters, applications and limitations.

Laser Beam Machining- Process description, Mechanism of material removal, process parameters, capabilities and limitations, features of machining, applications and limitations.

TEXT BOOKS:

1. *Advanced machining processes*, VK Jain, Allied publishers.
2. *Manufacturing processes for engineering materials* by Serope Kalpakjian and Steven R Schmid, 5edn, Pearson Pub.

REFERENCES:

1. *New Technology*, Bhattacharya A, The Institution of Engineers, India 1984
2. *Manufacturing Technology*, P N Rao, Tata McGraw hill



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

IV B.Tech-II Semester (ME)

L T C

(Department Elective –III)

3 1 3

(16ME336) Gas Turbine and Jet Propulsion

Course Educational Objectives:

- *To understand the basic difference between incompressible and compressible flow.*
- *To understand the phenomenon of shock waves and its effect on flow. To gain some basic knowledge about jet propulsion and Rocket Propulsion.*
- *(Use of Standard Gas Tables permitted)*

Course Outcomes:

Students undergoing this course are able to

- *Upon completion of this course, the students can able to successfully apply gas dynamics principles in the Jet and Space Propulsion*

UNIT-I

Gas Turbine Operating Cycles: Actual Brayton cycle, the cycle air flow rate, the cycle work ratio, optimum pressure ratio or maximum cycle thermal efficiency, means of improving the efficiency and the specific output of simple cycle.

UNIT-II

Gas Turbines; gas turbine applications, gas turbine advantages & disadvantages, energy flow & back work, deviation from ideal cycle, gas turbine with regeneration, thermal efficiency of gas turbine with & without regenerator, gas turbine engines, with inter-cooling & reheating.

UNIT-III

Jet Propulsion-Theory of jet propulsion – Thrust equation – Thrust power and propulsive efficiency – Operating principle, cycle analysis and use of stagnation state performance of ram jet, turbojet, turbofan and turbo prop engines.

UNIT-IV

Ram jet- Thermo dynamic cycle, plant lay out, essential components – principle of operation – performance evaluation – comparison among atmospheric thermal jet engines- serqujet and pulse jet, elementary treatment.

Rocket Engines: Need for, applications- basic principle of operation and parameters of performance – classification, solid and liquid propellant rocket engines, advantages, domains of application – propellants – comparison of propulsion systems.

UNIT-V

Rocket Technology: Flight mechanics, application thrust profiles, acceleration- staging of rockets, need for – feed systems, injectors and expansion nozzles – rocket transfer and ablative cooling.

Testing & instrumentation - need for Cryogenics – advanced propulsion systems, elementary treatment of Electrical nuclear and plasma Arc Propulsion.

TEXT BOOKS:

1. *Gas Turbines*, V.Ganesan TMGH
2. *Gas Turbines*, Cohen, Rogers & Sarvana Muttoo, Addison Wiley & longman

REFERENCES:

1. *Thermodynamics of propulsion*, Hill & Paterson.
2. *Rocket Propulsion*, Sutton.
3. *Element of Gas Turbines propulsion* , Jack D Matingly, MGH



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

IV B.Tech-II Semester (ME)

L T C

**(Department Elective –III)
(16ME337) Automation & Robotics**

3 1 3

Course Educational Objectives:

- *The subject should enable the students to understand the principles of automation, importance of automated flow lines and its types.*
- *To learn the concepts of Robotics, kinematics of robot, principles of robot drives and controls, sensors used in robots and programming methods.*

Course Outcomes:

Students undergoing this course are able to

- *After completion of this unit students are able to understand robot programming languages which may adopt in different applications of robot. Student also knows the control motion mechanism in all devices of robot and application of robots in manufacturing sector.*

UNIT-I

Introduction to Automation- Need, Types, Basic elements of an automated system, Manufacturing Industries, Types of production, Functions in manufacturing, Organization and information processing in manufacturing, and levels of automation. Hardware components for automation and process control, mechanical feeders, hoppers, orienters, high speed automatic insertion devices.

UNIT-II

Automated flow lines- Part transfer methods and mechanisms, types of Flow lines, flow line with/without buffer storage, Quantitative analysis of flow lines.

Assembly line balancing: Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT-III

Introduction to Industrial Robotics- Classification of Robot Configurations, functional line diagram, degrees of freedom. Components common types of arms, joints grippers, factors to be considered in the design of grippers.

Robot actuators and Feedback components: Actuators, Pneumatic, Hydraulic actuators, Electric & Stepper motors. Position sensors - potentiometers, resolvers, encoders - velocity sensors, Tactile sensors, Proximity sensors.

UNIT-IV

Manipulator Kinematics - Homogenous transformations as applicable to rotation and transition - D-H notation, Forward inverse kinematics.

Manipulator Dynamics - Differential transformations, Jacobians, Lagrange - Euler and Newton - Euler formations. Trajectory Planning: Trajectory Planning and avoidance of obstacles path planning, skew motion, joint integrated motion - straight line motion.

UNIT-V

Robot Programming -Methods of programming - requirements and features of programming languages, software packages. Problems with programming languages.

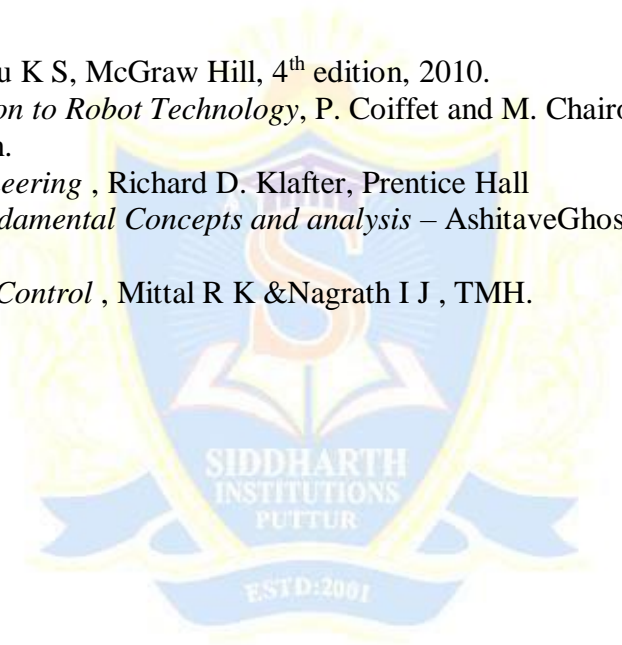
Robot Application in Manufacturing- Material Transfer - Material handling, loading and unloading - Process - spot and continuous arc welding & spray painting - Assembly and Inspection.

TEXT BOOKS:

1. *Automation , Production systems and CIM*,M.P. Groover/Pearson Edu.
2. *Industrial Robotics* - M.P. Groover, TMH.

REFERENCES:

1. *Robotics* , Fu K S, McGraw Hill, 4th edition, 2010.
2. *An Introduction to Robot Technology*, P. Coiffet and M. Chaironze, Kogam Page Ltd. 11283 London.
3. *Robotic Engineering* , Richard D. Klafter, Prentice Hall
4. *Robotics, Fundamental Concepts and analysis* – AshitaveGhosal,Oxford Press, 1/e, 2006
5. *Robotics and Control* , Mittal R K &Nagrath I J , TMH.



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

IV B.Tech-II Semester (ME)

L T C

**(Department Elective –III)
(16ME338) Advanced Welding Processes**

3 1 3

Course Educational Objectives:

- *Able to perform different weldability testing for different metals.*
- *To understand the application of preheat and PWHT of weld joints in industry*
- *Able to apply the knowledge about various methods for increasing service life of Equipments*

Course Outcomes:

At the end of the course student will be able to learn the-

- *Weldability and perform different weldability testing for different metals.*
- *Different dissimilar metal and its cladding.*
- *Application of preheat and PWHT of weld joints as per codes and standards used in fabrication industry.*
- *Knowledge about different methods for increasing service life of equipment.*

UNIT-I

Introduction to Welding: General survey and classification of welding processes. Conventional gas welding and cutting. Manual metal arc welding. Electrode coverings and their functions. Continuous processes based on above.

UNIT-II

Submerged arc welding — types of fluxes and their compounding Wire and strip electrodes. Gas shielded welding TIG and MIG and MAG/ CO₂ processes. Consideration of shielding gases, electrode polarity, current setting, metal transfer and arc length control. Plasma welding and cutting processes. Equipment maintenance, application of the above.

UNIT-III

Electrical power sources for welding: General characteristics of transformer, transformer — rectifier and motor generator sets. Use of pulsed currents. Pressure welding processes Solid phase bonding, friction welding, ultrasonic welding.

UNIT-IV

Explosive welding, Diffusion bonding and adhesive bonding. Resistance welding Spot, Seam and projection welding, Flash and upset butt welding.

UNIT-V

Brazing and soldering-Electron Beam, Laser and Infrared Welding. Principles, Operational details, Process controls and application of above processes.

TEXT BOOKS:

1. *The Science and Practice of Welding* by Davies, A.C., Cambridge Low Price Edition
2. *Welding Processes* by Houldcroft, P. T., PHI Publications

REFERENCES:

1. *Welding Technology* by Konigsberger, F. Mc Graw Hill Publications.
2. *Welding and Welding Technology* by Little, Richard L, TATA Mc Graw Hill Publications.
3. *Welding Engineering* by Rossi, Boniface E, PHI, Publications



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(16ME340) PROJECT WORK
