COURSE STRUCTURE AND

DETAILED SYLLABUS

MECHANICAL ENGINEERING

For B.TECH FOUR YEAR DEGREE PROGRAMME (Applicable for the batches admitted from 2018-2019)



VAAGDEVI COLLEGE OF ENGINEERING (Autonomous) Bollikunta, Warangal-506 005 Telangana State, India.

Department of Mech

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

MECHANICAL ENGINEERING COURSE STRUCTURE (Applicable for the batches admitted from A.Y. 2018-2019 onwards)

I-SEMESTER

Sl.No	Course Code	Title of the Course	L	Т	Р	Credits
1	B18MA01	Linear Algebra and Calculus	3	1	0	4
2	B18EN01	English	2	0	0	2
3	B18CH01	Engineering Chemistry	3	1	0	4
4	B18ME01	Engineering Graphics	1	0	4	3
5	B18CS01	Programming for Problem Solving	4	0	0	4
6	B18EN02	English Language Communication Skills Lab	0	0	2	1
7	B18CS02	Programming for Problem Solving Lab	0	0	2	1
8	B18MC01	Induction Programme	-	-	-	-
		Total Credits	13	2	8	19

II-SEMESTER

Sl.No	Course Code	Title of the Course	L	Т	Р	Credits
1	B18MA02	Differential equations and vector calculus	3	1	0	4
2	B18PH03	Engineering Physics	3	1	0	4
3	B18CE01	Engineering Mechanics	3	1	0	4
4	B18CS50	OOPs &Data structures	3	0	0	3
5	B18ME02	Engineering Work shop & IT workshop	0	0	3	1.5
6	B18PH04	Engineering Physics Lab	0	0	3	1.5
7	B18CS51	OOPs &Data structures Lab	0	0	2	1
8	B18MC03	NSS/NCC	0	0	2	0
		Total Credits	12	3	10	19

Department of Mech

R18-Regulations

Sl.No	Course Code	Title of the Course	L	Т	Р	Credits
1	B18EE02	Basic Electrical and Electronics Engineering	3	0	0	3
2	B18ME03	Metallurgy and Material Science	3	0	0	3
3	B18ME04	Mechanics of Solids	3	1	0	4
4	B18ME05	Thermodynamics	3	0	0	3
5	B18ME06	Machine Drawing	1	0	2	2
6	B18ME07	Mechanics of Solids and Metallurgy Lab	0	0	3	1.5
	B18ME08	Fuels and Lubricants Lab	0	0	2	1
7	B18EE03	Basic electrical and Electronics Engineering Lab	0	0	3	1.5
8	B18MC04	Indian Constitution	2	0	0	0
		Total Credits	15	1	10	19

III-SEMESTER

IV-SEMESTER

Sl.No	Course Code	Title of the Course	L	Т	Р	Credits
1	B18MC07	Gender Sensitization	2	0	0	0
2	B18MA05	Probability and Statistics	3	1	0	4
3	B18ME09	Fluid Mechanics and Hydraulic Machinery	3	0	0	3
4	B18ME10	Thermal Engineering-I	3	0	0	3
5	B18ME11	Kinematics of Machines	4	0	0	4
6	B18ME12	Production Technology	3	0	0	3
7	B18ME13	Fluid Mechanics and Hydraulic Machinery Lab	0	0	3	1.5
8	B18ME14	Production Technology Lab	0	0	3	1.5
		Total Credits	18	1	6	20

R18-Regulations

V-SEMESTER

SI. NO	Code	Subject	L	Т	Р	Credits
1	B18ME15	Machine Tools & Metal Cutting	3	0	0	3
2	B18ME16	Dynamics of Machinery	4	0	0	4
3	B18ME17	Design of Machine Members-I	3	0	0	3
4	B18ME18	Metrology and Surface Engineering	3	0	0	3
5	B18ME19	Thermal Engineering-II	3	0	0	3
6	B18MC09	Human Values & Professional Ethics	2	0	0	0
7		OPEN ELECTIVE-1	3	0	0	3
	B18MB01	1. Managerial Economics & Financial Analysis	3	0	0	3
	B18MB03	2. Entrepreneurship Development	3	0	0	3
	B18EE49	3. Energy Storage Systems	3	0	0	3
8	B18ME20	Thermal Engineering Lab	0	0	3	1.5
9	B18ME21	Metrology and Machine Tools Lab	0	0	3	1.5
TOTAL			21	0	6	22

B. Tech-MECH

Sl.No	Course Code	Title of the Course	L	Т	Р	Credits
1	B18ME22	Finite Element Methods	3	0	0	3
2	B18ME23	Design of Machine Member – II	4	0	0	4
3	B18ME24	Heat & Mass Transfer	3	0	0	3
4	B18MC02	Environmental Sciences	3	0	0	0
5		OPEN ELECTIVE – II	3	0	0	3
	B18MB05	Industrial Management				
	B18CS08	Data Base Management Systems				
	B18CE54	Disaster Management				
6		PROFESSIONAL ELECTIVE - I	3	0	0	3
	B18ME25	Nano Technology				
	B18ME26	Mechatronics				
	B18ME27	Automobile Engineering				
7		PROFESSIONAL ELECTIVE - II	3	0	0	3
	B18ME28	Maintenance and Safety Engineering				
	B18ME29	Mechanics of Composite Materials				
	B18ME30	Refrigeration and Air Conditioning				
8	B18ME31	Heat Transfer Lab	0	0	3	1.5
9	B18EN03	Advanced English Communications Skills Lab	0	0	3	1.5
TOTAL			22	0	6	22

VI-SEMESTER

B. Tech-MECH

VII-SEMESTER

SI.NO	Code	Subject	L	Т	Р	Credits
1	B18ME32	CAD/CAM	3	0	0	3
2	B18ME33	Instrumentation & Control Systems	3	0	0	3
3		PROFESSIONAL ELECTIVE-III	3	0	0	3
	B18ME34	Unconventional Machining Processess				
	B18ME35	Design for Manufacturing				
	B18ME36	Power Plant Engineering				
4		PROFESSIONAL ELECTIVE-IV	3	0	0	3
	B18ME37	Production Planning & Control				
	B18ME38	Robotics				
	B18ME39	Computational Fluid Dynamics				
5		PROFESSIONAL ELECTIVE-V	3	0	0	3
	B18ME40	Automation In Manufacturing				
	B18ME41	Non Conventional Energy Sources				
	B18ME42	Mechanical Vibrations				
6	B18ME43	CAD/CAM Lab	0	0	3	1.5
7	B18ME44	Instrumentation & Control Systems Lab	0	0	3	1.5
8	B18ME45	Mini Project Internship	0	0	0	2
9	B18ME46	Major Project Phase - I	0	0	8	4
TOTAL			15	0	14	24

R18-Regulations

VIII-SEMESTER

SI.NO	Code	Subject	L	Τ	Р	Credits
1		OPEN ELECTIVE-III	3	0	0	3
	B18MB06	Intellectual Property Rights				
	B18CE53	Air Pollution Control				
	B18MA07	Statistical Operations Research				
2		PR0FESSIONAL ELECTIVE-VI	3	0	0	3
	B18ME47	Plant Layout & Material Handling				
	B18ME48	CNC Technology				
	B18ME49	Jet Propulsion & Rocket Engineering				
3	B18ME50	Major Project Phase – 2	0	0	12	8
4	B18ME51	Technical Seminar	0	0	2	1
TOTAL			6	0	14	15

Department of Mech

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MA01) LINEAR ALGEBRA AND CALCULUS (Common to all Branches)

B. Tech: I-Semester

LTPC 3104

Pre-requisites: Mathematical Knowledge of 12th / intermediate level

Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations, Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen Values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal transformation.

UNIT-III: Sequences & Series

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences. Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: Calculus

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series.

R18-Regulations

Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity.

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and Minima of functions of two variables and three variables using method of Lagrange multipliers.

Course outcomes:

After learning the contents of this paper the student must be able to

- Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Analyze the nature of sequence and series.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.

Text Books

- 1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
- 2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John wiley & Sons, 2006.

References

- 1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- 2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- 3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18EN01) ENGLISH

B.Tech.: I-Semester

L T P C 2 0 0 2

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Learning Objectives: The course will help to a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. b. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. c. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

• Use English Language effectively in spoken and written forms.

• Comprehend the given texts and respond appropriately.

• Communicate confidently in various contexts and different cultures.

• Acquire basic proficiency in English including reading and listening comprehension, writing and speaking

skills.

SYLLABUS

UNIT –I Social Media
Vocabulary Building: Speech Units.
Grammar: Redundancies and Cliches.
Reading: Comprehension and inferencing, reading for facts and opinions.
Basic Writing Skills: E-mail, E-mail etiquette
Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II Superheroes Vocabulary: Idiomatic Expressions. Grammar: Question tags. Reading: Reading for Comprehension

Department of Mech

B. Tech-MECH

Writing: Gadget review.

UNIT –III History Vocabulary: The concept of word formation-the use of Prefixes and Suffixes. Grammar: Prepositions. Reading: Scanning, reading for Comprehension Writing: Types of Paragraphs.

UNIT –IV Aliens Vocabulary: One word substitutes Grammar: Articles. Reading: Comprehension and inference Writing: Writing Practices—Description.

UNIT –V Inventors Vocabulary: Contracted forms of verbs Grammar: Tense and Aspects. Reading: Skimming Writing: Technical Reports- Information transfer-Describing trends.

UNIT –VI Indian Architecture Vocabulary: Synonyms and Antonyms Grammar: Conjunctions Reading: Understanding a historical essay Writing: Describing structures.

UNIT –VII War Vocabulary: Homonyms, Homophones and Homographs Grammar: Subject-verb agreement Reading: Reading to summarise Writing: Letter of enquiry.

UNIT –VIII Sports Vocabulary: Word stress Grammar: Common Errors Reading: Scanning a text Writing: Letters of complaint.

UNIT –IX Fashion Vocabulary: Words often confused Grammar: Active and Passive Voice Reading: Reading a procedure Writing: Types of essays, argumentative essay.

UNIT –X Genetics Vocabulary: Abbreviations and acronyms Grammar: Common Errors in Tenses Reading: Categorizing Information Writing: Report writing.

Department of Mech

Prescribed Textbook:

-English for Technical Communication by Sudarshana, N.P. and C. Savitha, Cambridge University Press.

References:

- 1. Swan, M. (2016). Practical English Usage. Oxford University Press.
- 2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
- 3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
- 4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
- 5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
- 6. Exercises in Spoken English. Parts I-III. CIEFL, Hyderabad. Oxford University Press.

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CH01) ENGINEERING CHEMISTRY

B.Tech.: I-Semester

L T P C 3 1 0 4

Course Objectives:-

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, different batteries, solar cells, corrosion and water treatment which are essential for the Engineers and in industry.
- To acquire the skills and knowledge to organic reactions and importance of polymers in engineering and everyday life.

UNIT-I: Molecular structure (8 Lectures)

Metallic bonding, valence bond theory, crystal field theory and the energy level diagrams of transition metal ions (splitting of d-orbitals in octahedral and tetrahedral geometry) and their magnetic properties. Atomic and molecular orbitals. LCAO, molecular orbital theory of diatomic molecules. $N_2 \& O_2$.

UNIT-II: Organic reactions and Polymers (8 Lectures)

Organic Chemistry: Introduction to types of organic reactions involving substitution, addition, elimination, oxidation by KMnO₄, OsO₄, reduction by LiAIH₄, NaBH₄

Polymers: Introduction to polymers, classification of polymers, mechanism of free radical addition polymerization, properties of polymers-crystallinity, melting point, boiling point and glass transition temperature. Conducting polymers-classification, mechanism of conduction in conducting polymers-poly acetylene and ploy aniline, applications.

UNIT-III: Electrochemistry (12 Lectures)

Introduction to electrochemistry, conductance-specific, equivalent and molar conductance, units and their relation. Numerical Problems. Applications of conductance – conductometric titrations.

Electrochemical and Electrolytic cells, Galvanic cell, Electro chemical series-applications, measurement of e.m.f. and single electrode potential, Nernst's equation and its applications, Types of electrodes: Reference electrodes (SHE, SCE and QH), Ion-selective electrode-glass electrode, applications of electrode potentials-determination of pH and potentiometric titrations. Batteries: primary cells-lithium cells. Secondary cells – Pb-acid storage cell, lithium-ion cells. Fuels cells-hydrogen-oxygen fuel cell. Methanol-oxygen fuel cell-advantages nd applications.

UNIT-IV: Water Technology & Corrosion (10 Lectures)

Introduction, types of hardness, units and Numerical problems. Estimation of hardness of water-EDTA method. Boiler troubles-scales and sludges. Treatment of Boiler feed water-Ion-exchange process. De-salination of brackish water-Reverse Osmosis. Domestic water treatment-specifications and steps involved in the treatment of potable water.

R18-Regulations

Corrosion: Introduction, causes of corrosioin, types of corrosion-dry and wet corrosionmechanism of electrochemical corrosion. Caustic embrittlement and boiler corrosion. Factors affecting corrosion and corrosion control methods-proper designing, cathodic protection(sacrificial anodic protection and impressive current cathodic protection) and surface coatings (anodic and cathodic), Methods of application of metal coatings-Hot dipping(galvanization and tinning) and electroplating of copper.

UNIT-V: Phase rule and Surface chemistry (10 Lectures)

Phase rule: Definition of terms, phase rule equation, phase diagrams: one component system – water system, two component system- Ag-Pb system, Iron-carbon phase diagram-cooling curves, annealing and case hardening.

Surface Chemistry: Adsorption-types of adsorption, adsorption isotherms- Freundlich adsorption isotherm and Langmuir adsorption isotherm, applications of adsorption.

Course Outcomes: The basic concepts included in this course will help the student to gain:

- The knowledge of molecular and electronic changes, band theory related to conductivity.
- > The knowledge of water treatment and corrosion.
- > The knowledge of organic reaction mechanisms and polymers.
- > The required principles and concepts of electro chemistry and batteries.

Suggested Reading:

- 1. Text book of Engineering Chemistry by Jain & Jain.
- 2. Text book of Engineering Chemistry, CENGAGE learning by Prasanta Rath, B. Ramadevi, Ch. Venkata Ramana Reddy & Subhendu Chakroborty.
- 3. University chemistry, by B. H. Mahan
- 4. Engineering Chemistry by Shashi Chawla

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME01) ENGINEERING GRAPHICS

B.Tech.: I-Semester ME, CIVIL, CSE II-Semester: EEE, ECE

L/T/P/C 1/-/4/3

COURSE OBJECTIVES:

- 1. Use various engineering drawing instruments.
- 2. Learn the basic convention of drawings, dimensioning, scales and conic sections like ellipse, parabola and parabola.
- 3. Learn projection of points, lines viewed in different positions.
- 4. Learn projections of plane surfaces and solids viewed in different positions.
- 5. Gain knowledge of sections of solids and their usage in real time applications.

Unit – I

Introduction to Engineering Drawing:

Principles of Engineering Graphics and their significance, ISO and ANSI standards for coordinate dimensioning- usage of Drawing instruments, lettering

- a. Conic sections including the Rectangular Hyperbola (General method only);
- b. Roulettes-Cycloid, Epicycloid, Hypocycloid
- c. Involute
- d. Scales Plain, Diagonal and Vernier Scales.

Unit –II Principles of Orthographic Projections in First Angle Projection- Conventions Projections of Points

Projection of lines: Parallel, Perpendicular inclined to one plane and inclined to both the planes.

Unit-III

Projection of planes: Plane parallel, perpendicular and inclined to one reference plane. Planes inclined to both the reference planes – Auxiliary Planes;

Projection of Regular Solids-Projection of regular solids, Cube, prisms, pyramids, tetrahedron, cylinder, Cylinder and cone, axis inclined to one plane and both planes – Auxiliary Views Projections of Regular Solids.

Unit-IV

Sections and sectional views of right angular solid-Prism, Cylinder, Pyramid, Cone – Auxiliary Views; **Development of surfaces** of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

Unit-V Isometric Projections:

Chapter-I Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric views to Orthographic views and Vice-versa, Conventions.

Chapter-II Overview of Computer Graphics: listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software -The Menu System, Toolbars Standard, Object Properties, Draw, Modify and Dimension.

Text Books

- 1. Agrawal B & Agrawal C.M. (2012), Engineering Graphics, TMH Publications.
- 2. Bhatt N.D., Panchal V.M. & Ingke P.R., (2014), Engineering Drawing, Charotar Publishing House.

References

- 1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
- 2. (Corresponding set of) CAD Software Theory and User Manuals.
- 3. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
- 4. Engineering Drawing P.J.Shan S.Chand Publishers.
- 5. Engineering Drawing Johle/Tata McGraw Hill Book Publishers.

COURSE OUTCOMES:

The students will be able to

- 1. Analyse the Projections of Points.
- 2. Understand the projections of solids.
- 3. Estimate the use of drawings, dimensioning, scales and conic sections
- 4. Modify the applications of this knowledge in computer graphics.
- 5. Compare the Conversion of Isometric views to Orthographic views

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CS01) PROGRAMMING FOR PROBLEM SOLVING

B.Tech : I-Semester: ECE, CSE, Mechanical & Civil **II-Semester: EEE**

L/T/P/C 4/0/0/4

Syllabus Content

UNIT -1

INTRODUCTION TO COMPUTERS:

Block Diagram of Computer, Memory Hardware, Software, Operating Systems, Steps in Problem Solving, Algorithms, Flowcharts, Pseudo code, Types of Programming Languages, Introduction to C, History of C, Structure of a C Program. (Chapter 1: 1.1 - 1.10, 1.17 - 1.20)

Introduction to C Programming: The C Character Set, Identifiers and - Keywords, Data Types, Constants and Variables, Declarations, Expressions & Statements, Input / Output Statements (Formatted and Unformatted), Creating and Running a C program. (Chapter 2: 2.1 - 2.27 & Chapter 4: 4.1 - 4.17)

Operators and Expressions : Unary Operators Arithmetic Operators, Relational and Logical Operators, Assignment Operators, Conditional operator, Bitwise Operators, special operators, Precedence & Associativity, Type Casting and Type Conversion. (Chapter 3:3.1-3.17)

UNIT - 2

CONTROL STATEMENTS:

Branching Statements - if, if-else, else- if, nested-if. Switch statement. Un-conditional Branching Statement- goto. Looping Statements- while, do-while, for, nested loops. Break & Continue.

(Chapter 6: 6.1 - 6.47)

Functions: Introduction, Defining a Function, Types of Functions, Accessing a Function, Function Prototypes, Passing Arguments to a Function – call by value, Recursion. (Chapter 7: 71. - 7.26)

Storage Classes: Automatic Variables, External (Global) Variables, Static Variables, Register. (Chapter 8: 8.1 - 8.13)

UNIT – 3

Arrays:

Definition - Single Dimensional Arrays, Multi Dimensional Arrays, Declaration, Initialization, Reading & Writing elements in to an Array, Passing Arrays to Functions. Linear Search, Binary search, Bubble sort

(Chapter 9: 9.1 - 9.29 & Reference book 2:)

Strings: Declaration and Initialization of Strings, Reading and Writing a String, String Manipulation Functions, String as Array of Characters, Array of strings, Sorting of Strings. (Chapter 10: 10.1 - 10.15)

Structures and Unions: User-Defined Data Types , Defining a Structure, Processing a Structure, Array of Structures, Nested Structures, Passing Structures To Functions. Unions. Typedef. Enumerated types - enum. (Chapter 12:12.1, 12.2, 12.3, 12.5, 12.7)

UNIT – 4

Pointers: Introduction, Pointer Declarations, Pointer to Pointer, Operations on Pointers -Pointer Arithmetic, Dynamic Memory Allocation – Malloc(), Calloc(), Realloc(), Free(). Pointers and Functions - call by Reference, Pointers and Arrays (one dimensional, two dimensional), Array of Pointers. Structures and Pointers, Self-Referential Structures. (Chapter 11: 11.1 – 11.31 & Chapter 12: 12.4, 12.6)

UNIT-5

File Handling: Introduction, Text Files and Binary Files, File Handling Functions-Opening and Closing a File, File Opening Modes, Reading and Writing a File. Random Access File Functions – fseek(), rewind(), ftell(). (Chapter 13: 13.1 – 13.31) Command Line Arguments, C Preprocessor Directives (Chapter 15: 15.7,15.20)

TEXT BOOK:

Byron Gottfried, "Programming with C", Third Edition(Schaum's Outlines) McGraw Hill.

REFERENCE BOOKS:

- 1. B.A. Forouzan and R.F. Gilberg ,"C Programming and Data Structures", Cengage Learning (3rd Edition)
- 2. Pradip Dey & Manas Ghosh, "Programming in C", 2nd Edition, Oxford University Press, 2013.
- 3. E. Balaguruswamy, "Programming in ANSI C", McGraw-Hill Education, 2008.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18EN02) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.Tech.: I-Semester

L T P C 0 0 2 1

The **Language Lab** focuses on the production and practice of sounds of language to familiarize the students with the use of English in everyday situations both in formal and informal contexts.

COURSE OBJECTIVES:

- 1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- 2. To sensitize students to the nuances of English speech sounds, stress and intonation.
- 3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- 4. To improve the fluency of students in spoken English and neutralize the influence of the sounds of their mother tongue
- 5. To train students to use language appropriately for public speaking and interviews

LEARNING OUTCOMES:

Students will be able to attain -

- 1. Better understanding of nuances of English language through audio- visual experience and group activities
- 2. Speaking with clarity and confidence which in turn enhances their employability skills

SYLLABUS:

English Language and Communication Skills Lab (ELCS) shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab
- c. Listening Skills

OBJECTIVES

- 1. To enable the students develop their listening skills so that they may appreciate its role in developing
 - LSRW skills language and improve their pronunciation
- 2. To impart the students with necessary training in listening so that they can understand the speech of people of different backgrounds and regions

R18-Regulations

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

• Listening for general content • Listening to fill in information • Intensive listening • Listening for specific information

SPEAKING SKILLS

Objectives

1. To involve the students in speaking activities in various contexts

2. To enable the students express themselves fluently and appropriately in social and professional contexts

• Oral practice: Just A Minute (JAM) Sessions • Describing objects/situations/people • Role play – Individual/Group activities

The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B. Tech First English.

EXERCISE – I

CALL Lab: Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonantal Phonemes.

ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language. Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

EXERCISE – II

CALL Lab: Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab: Understand: Features of Good Conversation – Non-verbal Communication. Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

EXERCISE - III

CALL Lab: Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab: Understand: How to make Formal Presentations. Practice: Formal Presentations.

EXERCISE – IV

CALL Lab: Understand: Listening for General Details. Practice: Listening Comprehension Tests.

ICS Lab: Understand: Public Speaking – Exposure to Structured Talks. Practice: Making a Short Speech – Extempore.

EXERCISE – V

CALL Lab: Understand: Listening for Specific Details. Practice: Listening Comprehension Tests.

ICS Lab: Understand:Debate/Group Discussion/ Interview Skills. Practice:Mock Group Discussion/ Mock Interviews.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CS02) PROGRAMMING FOR PROBLEM SOLVING - LAB

B.Tech.: I-Semester

L T P C 0 0 2 1

WEEK-1

- 1.a) Write a C program to find the areas of shapes like circle, square, rectangle and triangle
- 1.b) Write a C program to demonstrate Type Casting and Type Conversion.

WEEK-2

2.a) Write a C program to find the roots of a quadratic equation.

- 2.b) Write a C program to find greatest of any 3 numbers.
- 2.c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

WEEK-3

- 3.a) Fibonacci sequence is defined as follows: the first and second terms in sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- 3.b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- 3.c) Write a C program to find the second largest number in a set of n numbers.

WEEK-4

- 4.a) Write a C program to generate Pascal's triangle.
- 4.b) Write a C program to find the LCM(Least Common Multiple) and GCD (greatest common divisor) of two given integers.
- 4.c) Write a C program to construct a pyramid of numbers.

WEEK-5

- 5.a) Write a C program to find sum of series $1+x^{1}+x^{2}+x^{3}+...+x^{n}$ using functions.
- 5.b) Write a C program to find factorial of a given number using Recursion.
- 5.c) Write a C program to demonstrate the use of Storage Classes

R18-Regulations

WEEK-6

- 6.a) Write a C program to find both the largest and smallest number in a list of integers.
- 6.b) Write a C program to reverse the elements of an array (i.e., the first value should become last value etc.)
- 6.c) Write a C program to insert an element at a given position in an Array using functions.

WEEK-7

- 7. Write a C program to perform all of the following:
 - a) Matrix Addition and subtraction
 - b) Matrix Multiplication
 - c) Find Transpose and test if a matrix is symmetric or not
 - d) test if a matrix is identity matrix or not

WEEK-8

8.a) Write a C program to perform linear search

- 8.b) Write a C program to perform binary search
- 8.c) Write a C program to sort the elements using bubble sort

WEEK-9

- 9.a)Write a C program to insert a sub-string in to a given main string at a given position.
- 9.b) Write a C program to count number of characters, words and sentences in a given text.
- 9.c) Write a C program to determine if the given string is a palindrome or not.
- 9. d) Write a C program to sort the given names in alphabetical order.

WEEK-10

- 10.a) Write a C program to implement array of structures.(use student structure).
- 10.b) Write a menu driven C program that uses functions to perform the following operations on complex numbers stored in a structure:
 i.Reading a complex number
 ii.Writing a complex number
 iii.Addition of two complex numbers
 iv.Multiplication of two complex numbers
- 10.c) Write a C program to demonstrate Unions and enum.

R18-Regulations

WEEK-11

- 11.a) Write a C program for Pointer Arithmetic.
- 11.b) Write a C program to swap two numbers using Call by value and Call by reference.
- 11.c) Write a C program to demonstrate calling of a function (like add, subtract, multiply) using a function pointer.

WEEK-12

12.a)Write a C program using pointer to create a two dimensional matrix, to input values in to the matrix and to display the matrix and its transpose. Free the memory properly.

12.b)Write a C program to demonstrate on structures and pointers.

12.c) Write a C program for dynamic creation of structures using pointers

WEEK-13

- 13.a)Write a C program to count no of alphabets, no of digits, no of special symbols, no of white spaces and no of tabs in a given text file.
- 13.b) Write a C program which copies one text file to another text file and verify the correctness.
- 13.c) Write a C program which copies one binary file to another binary file and verify the correctness.

WEEk-14

- 14.a) Write a C program to produce reverse of the content of a text fie into another text file and verify the result.
- 14.b) Write a C program to merge two text files into a third text file (i.e., the contents of the first file followed by those of the second are put in the third file) and verify the correctness.

WEEk-15

- 15.a) Write a command-line C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)
- 15.b)Write a C Program that removes all comment lines from a C source file.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MC01) Induction Programme (Common to all Branches)

B. Tech. II Semester

When new students enter an institution, they come with diverse backgrounds, thoughts and preparations. It is very important to help them adjust to the new environment. The following are the activities of induction program in which the students would be fully engaged throughout the day for entire duration of the program.

- 1. **Physical Activity:** This would involve a daily routine of physical activity with games and sports. Each student should pick one game and learn it for three weeks. This would also involve gardening or other suitably designed activity.
- 2. **Creative Arts:** Every student would select one skill related to arts whether visual arts or performing arts. The student would practice it every day for the duration of the induction program.
- 3. Universal Human Values: This will help the students to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with inmates, etc.
- 4. **Proficiency Modules:** During the induction program crash courses have to be conducted to improve English skills.
- 5. Lectures by Eminent people: This period can be utilized for lectures by eminent personalities. It would give the students exposure to people who are in public life and are socially active.
- 6. Literary: Literary activity would encompass reading, writing and debating, enacting a play, etc.
- 7. Familiarization to Dept./Branch & Innovations: The students are explained about different methods of study. They are further explained about the different aspects of their branches, departments and the role they play in the society. The different laboratories, workshops & other facilities available in the departments are introduced to the students. Notwithstanding the above activities of the induction program, any other relevant activity may be planned to enthuse, encourage and benefit the students.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MA02) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (Common to all Branches)

B. Tech. II Semester

L T P C 3 1 0 4

Pre-requisites: Mathematical Knowledge of 12th / Intermediate level

OBJECTIVES: To learn

- Methods of solving the differential equations of first and higher order.
- Evaluation of multiple integrals and their applications
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

UNIT-I

First Order ODE:

Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II

Ordinary Differential Equations of Higher Order

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax} , sin ax, cos ax, polynomials in x, $e^{ax}V(x)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III

Multivariable Calculus (Integration):

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallel piped).

UNIT-IV

Vector Differentiation:

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V

Vector Integration:

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

Course outcomes:

After learning the contents of this paper the student must be able to

- Identify whether the given differential equation of first order is exact or not
- Solve higher differential equation and apply the concept of differential equation to real world problems
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and gravity for cubes, sphere and rectangular parallel piped
- Evaluate the line, surface and volume integrals and converting them from one to another

TEXT BOOKS

- 1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Editions, 2010
- Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006

REFERENCES

- G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002
- 2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishers
- 3. S.L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18PH03) ENGINEERING PHYSICS

B. Tech: II Semester: CIVIL, MECH

LTPC 3 10 4

COURSE OBJECTIVES:

- The aims of Physics provide an adequate exposure and develop insight about the basic principles of physics along with the engineering applications.
- The acquaintance of basic physics principles would help the engineers to understand the tools and techniques used in the industry and provide the necessary foundations for inculcating innovative approach.
- Student will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, lasers, Semiconductor and photo detectors, a broad base of knowledge in physics.
- Hence physics the foundation on which stands the elaborate structure of technology.

UNIT I

MECHANICS:

Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical coordinates.

UNIT II

RIGID BODY DYNAMICS

Definition and motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler's law of motion, their independence from Newton's laws. And their necessity in describing rigid body motion; Examples

UNIT III

QUANTUM MECHANICS

Failures of classical mechanics, Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle. Particle in one dimension box.

R18-Regulations

UNIT IV

SEMICONDUCTOR PHYSICS

Introduction to intrinsic and extrinsic semiconductors, Fermi level, Effect of carrier concentration and temperature on Fermi level, Energy diagram of p-n-diode, characterization and working of LED and Solar cells.

UNIT V

LASERS

Characteristics of lasers, absorption, spontaneous emission, stimulated emission. Einstein's theory of matter radiation interaction and A and B Coefficients; amplification of light by population inversion, Ruby laser, He-Ne laser, CO₂ laser, Nd-YAG laser, applications of lasers in science, Engineering and Medicine.

COURSE OUTCOMES:

- The student learns about transformation concept learns basics of quantum mechanics.
- The student gains knowledge on basics of rigid body dynamics and lasers which leads to new innovations and improvements.
- The knowledge of physics relevant to engineering is critical for converting ideas into technology.
- Characterization and study of properties of optodevices helps the students to prepare new materials for various engineering applications.

TEXT BOOKS

- 1. A Text Book of Engineering Physics, Dr. M.N. Avadhanulu, Dr. P.G. Kshrisagar-S.Chand.
- 2. Engineering Physics, P.K.Palani Swamy, Scitech Publicatiobs.
- 3. Engineering Physics V. Rajendran, Tata Mc Gram Hill Book Publishers.
- 4. Modern Engineering Physics (Vol-I & II), Dr. K. Vijaya Kumar, Dr. S. Chandralingam S.Chand.

REFERENCES

- 1. J. Singh Semiconductor Optoelectronics: Physics and Technology, Mc. Graw-Hill Inc (1995).
- 2. O.Svelto, "Principles of Lasers".
- 3. "Introduction to Mechanics", M.K. Verma, Universities press.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CE01) ENGINEERING MECHANICS

B.Tech: II Semester: Common to Civil and Mechanical

L T P C 3 1 0 4

UNIT – I

Introduction - Specification of force vector, Formation of Force Vectors, Moment of Force – Cross product – Problems, Resultant of a general force system in space, Degrees of freedom -Equilibrium Equations, Kinematics – Kinetics – De' Alembert's principle, Degree of Constraints – Free body diagrams.

UNIT II

Spatial Force systems - Concurrent force systems - Equilibrium equations – Problems, Problems (Vector approach) – Tension Coefficient method, Problems (Tension Coefficient method), Parallel force systems - problems, Center of Parallel force system – Problems.

UNIT-III

Coplanar Force Systems - Introduction – Equilibrium equations – All systems, Problems on Coplanar Concurrent force system, Coplanar Parallel force system, Coplanar General force system – Point of action, Method of joints, Method of sections, Method of sections, Method of members, Friction – Coulombs laws of dry friction – Limiting friction, Problems on Wedge friction, Belt Friction-problems.

UNIT – IV

Mechanics of Deformable Bodies - Stress & Strain at a point- Normal and shear stresses, Axial deformations – Problems on prismatic shaft, tapered shaft and deformation due to selfweight, Deformation of Stepped shaft due to axial loading, Poisson's Ratio – Bulk Modulus -Problems, change in dimensions and volume.

Centroid & Moment of Inertia - Centroid & M.I – Arial & Mass M.I – Radius of Gyration, Parallel axis– Perpendicular axis theorem – Simple Problems.

UNIT-V

Dynamics of Particles - Rectilinear Motion – Kinematics Problems, Kinetics – Problems, Work & Energy – Impulse Moment, Direct Central Impact – coefficient of restitution, Curvilinear Motion – Projectile Motion, Work & Energy in Curvilinear motion.

Dynamics of Rigid Bodies - Rigid body rotation – Kinematics - Kinetics, Problems – Work & Energy in Rigid body rotation, Plane Motion – Kinematics, Problem – Instantaneous center of rotation.

Text Books

- 1. J.L.Meriam and L.G. Kraige, Engineering Mechanics, 7th Ed, John Wiley & Sons, 2012.
- 2. Timoshenko and Young, Engineering Mechanics, 3rd Ed, McGraw Hill Publishers, 2006.
- 3. Gere and Timoshenko, Mechanics of Materials, 2nd Ed, CBS Publishers, 2011.

R18-Regulations

COURSE OUTCOMES:

The students will be able to

- 1. Know the fundamental knowledge of Specification of force vector.
- 2. Compare Spatial Force systems.
- 3. Understand the Coplanar Force Systems.
- 4. Apply Deformation of Stepped shaft due to axial loading in problems.
- 5. evaluate Kinematics Problems and Kinetics Problems

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CS50) OOPs and DATA STRUCTURES

B.Tech: II-Sem: MECH & CIVIL

L/T/P/C 3/0/0 /3

Syllabus Content

UNIT-1

BASIC CONCEPTS: of Object Oriented Programming, Benefits of OOP. C++ fundamentals.

(TB-1: Ch 1 & 2. Pg.No.6-11 & 16-26).

Classes and Objects: Class Definition, Objects, Defining and accessing class members, Access specifiers, Inline functions, static data members & member functions, friend functions. (TB-1: Ch 1 & 5. Pg.No.90-115).

Constructors and Destructors: Introduction, types of constructors, Constructor overloading, Destructors, Dynamic memory allocation and de-allocation -new and delete. (TB-1: Ch 6. Pg.No. 131-148).

UNIT-2

Function Overloading. (TB-1: Ch 4. Pg.No.82-84).

Operator Overloading: Definition, Overloading Unary and Binary Operators (TB-1: Ch 7. Pg.No. 155-161).

Inheritance: Basics, types of inheritance- single, multilevel, multiple, hierarchical and hybrid. Virtual Base Classes, Abstract classes (TB-1: Ch 8 Pg.No.182 -210).

Virtual functions and Runtime Polymorphism, pure virtual functions. (TB-1: Ch97. Pg.No. 246-252).

Templates: Class Templates, Function Templates (TB-1: Ch 12 Pg.No. 323-336).

UNIT-3

Basic data structures: Algorithms, Performance Analysis – Time Complexity and Space Complexity. (TB-2: Ch 1 Pg. No. 14-20).

The Linked List ADT – Basic Concepts, Single Linked List Operations -Insert, Delete, Search. Doubly Linked List, Circular Linked List (TB-2: Ch 3. Pg.No. 81-93, 113-119).

The Stack ADT- Definition, Basic Stack Operations-Push & Pop, Stack Representation-Array & Linked List. Infix to Postfix conversion. (TB-2: Ch 4. Pg.No. 156-165).

The Queue ADT- Definition, Array & Linked list implementation, operations- Enqueue, Dequeue (TB-2: Ch5. Pg.No.217-220).

UNIT-4

Hashing: Hash Table Representation, Hash functions, Collision Resolution (TB-2: Ch 2. Pg.No. 49-67).

Trees: Introduction to trees, Binary Trees, Binary Tree Representation, Binary Tree Traversals (TB-2: Ch 7. Pg.No. 305-324).

Search Trees: Binary Search Trees, Operations on Binary Search Trees, AVL Trees, Rotations on AVL Trees, Operations on AVL Trees. (TB-2: Ch 8. Pg.No. 338-372).

UNIT-5

Priority Queues: Definition, ADT, Realizing a priority queue using Heaps, Insertion, Deletion.

(TB-2: Ch 9. Pg.No. 416-423).

Graphs: Basic terminology, Graph Storage Structure – Adjacency Matrix, Adjacency List. Graph Traversals – Depth First Search, Breadth First Search (TB-2: Ch 12. Pg.No. 560-570).

TEXT BOOKS:

1. E. Balaguruswamy, **"Object Oriented Programming with C++"**, 5th Edition, Mc Graw-Hill Education India.

2. Richard F. Gilberg & Behrouz A. Forouzan, **"Data structures A Pseudo code Approach with C++**", Thomson Brooks Cole.

REFERENCE BOOKS:

1. Mark Allen Weiss, "Data structures and Algorithm Analysis in C++", Pearson Education. Ltd., Second Edition.

Adam Drozdek , "Data structures and algorithms in C++", 3rd Edition, ,Cengage Learning.
 Bjarne Stroustrup, "The C++ Programming Language", 4th Edition.

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME02) ENGINEERING WORKSHOP& IT WORKSHOP

B.Tech: I-Sem: EEE, ECE II-Sem: Civil, Mechanical, CSE

L/ T/ P/ C -/-/3/1.5

COURSE OBJECTIVES:

1. Know the usage of various tools and their application in carpentry, tin smithy.

2. Know the usage of various tools and their application in black smithy, foundry, welding and house wiring.

3. Make lap joint and dove tail joint in carpentry.

- 4. Make scoop, funnel and tray like items in tin smithy.
- 5. Use one way, two-way switches, parallel and series connections in house wiring.

6. Know the basics of welding.

UNIT – I

TRADES FOR EXERCISES: (Any six trades from the following for Mechanical Engineering Branch & Any four trades for all other Branches with minimum of two exercises in each trade)

- 1. Carpentry
- 2. Fitting
- 3. Tin Smithy
- 4. Black Smithy
- 5. House wiring
- 6. Foundry
- 7. Plumbing
- 8. Soldering

UNIT - II

TRADES FOR DEMONSTRATION & EXPOSURE

- 1. Demonstration of Power tools & wiring
- 2. Welding.
- 3. Machine Shop

UNIT – III

IT WORKSHOP I: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, simple diagnostic exercises.

IT WORKSHOP II: Installation of operating system windows and Linux simple diagnostic exercises.

R18-Regulations

TEXTBOOKS:

- 1. Workshop Manual P.Kannaiah / K.L.Narayana/Scitech Publishers.
- 2. Workshop Manual Venkat Reddy/BS Publication / 6th Edition.

COURSE OUTCOMES:

The students will be able to

- 1. Know the fundamental knowledge of various trades and their usage in real time Applications.
- 2. Compare Foundry, Welding, Black smithy, Fitting, Machine shop and house wiring.
- 3. Understand the basis for analyzing power tools in construction and wood working, electrical engineering and mechanical engineering.
- 4. Apply basic concepts of computer hardware for assembly and disassembly.

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18PH04) ENGINEERING PHYSICS LAB

B. Tech: II Sem. CIVIL, MECH

L T P C 0 0 3 1.5

OBJECTIVES:

The purpose of doing the experiments in laboratory is not simply to verify a principle but also to explore the other related phenomena and to find their applicability. The students are suggested to work in this direction and get benefit out of it.

- 1. To get practical knowledge which is related to the engineering course in the development of new technologies
- 2. To impart fundamental knowledge in handling the equipments in Physics laboratory.

Sl. No.

Name of the Experiment

- 1. Torsional Pendulum-determination of rigidity modulus of material of a wire.
- 2. Determination of energy gap of material of p-n junction.
- 3. Study LED diode V-I and P-I Characteristics.
- 4. Study LASER diode V-I and L-I Characteristics.
- 5. Bending losses of optical fibres and evaluation of numerical aperture of a given optical fibre.
- 6. Study of Decay of charge & determination of time constant of an RC circuit.
- 7. Study of Characteristics of solar cell.
- 8. Determination of wavelength of Laser source Diffraction grating.
- 9. Determination of frequency of AC supply sonometer.
- 10. Determination of wavelength of monochromatic source using diffraction grating.

OUTCOMES:

The laboratory course helps the student how to operate different equipments related to engineering. It also allows the student to develop experimental skills to design new experiments in engineering.

The course enlightens the student about modern equipment like solar cell, optical fibre etc., With the exposure to these experiments, the student can compare the theory and correlate with experiment
R18-Regulations

VAAGDEVI COLLEGE OF ENGINERRING (AUTONOMOUS)

(B18CS51) OOPs & DATA STRUCTURES LAB

B.Tech: II Sem: Civil & Mech

L T P C 0 0 2 1

Syllabus Content:

- 1. Write a C++ program to demonstrate class.
- 2. Write a C++ program on constructor.
- 3. Write a C++ program on inline functions.
- 4. Write a C++ program on this pointer.
- 5. Write a C++ program on function overloading.
- 6. Write a C++ program on operator overloading.
- 7. Write a C++ program that illustrates how run time polymorphism is achieved.
- 8. Write a C++ program on multiple inheritance.
- 9. Write a C++ program to demonstrate templates.
- 10. Write a C++ program for single linked list operations.
- 11. Write a C++ program to implement Stack ADT using array.
- 12. Write a C++ program to implement Queue ADT using array.
- 13. Write a C++ program to implement Stack ADT using linked list.
- 14. Write a C++ program to implement Queue ADT using linked list.
- 15. Write a C++ program that uses functions to traverse the given binary tree in
 - a) Preorder b) Inorder c) Postorder
- 16. Write a C++ program to implement DFS and BFS for a graph.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINERRING (AUTONOMOUS)

(B18EE02) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. III-Sem Mech. Engg. (Common to Mechanical, Civil)

L T P C 3003

Pre-Requisites: None

UNIT-I:

Electrical Circuits: Circuits concept, R-L-C Parameters, Voltage and Current sources, Source Transformation, V–I relationship for Passive elements, Kirchoff's Laws, Network reduction techniques – series, parallel, series parallel, star-delta & star-delta transformations, Nodal Analysis, Mesh analysis with DC excitations. Network Theorems - Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity Theorems with DC excitation.

UNIT-II:

Single Phase AC Circuits - R.M.S. and Average values, Form Factor, steady state analysis of series, Parallel and Series parallel Combinations of R, L and C with Sinusoidal excitation, concept of reactance, Impedance, Susceptance and Admittance – phase and phase difference, Concept of Power Factor, j-notation, complex and Polar forms of representation. Three Phase AC Circuits: Production of $3 - \phi$ Voltages, Voltage & Current relationships of Line and Phase values for Star and Delta connections.

UNIT-III:

D.C.Machines: Constructional features, Methods of Excitation, E.M.F. Equation and Applications, Torque development in D.C motor, Characteristics of DC motors, losses, Efficiency, Swinburne's test, Speed control of DC Shunt motors Single Phase Transformers: Construction and principle of operation, Development of No Load & On Load Phasor diagrams (Basic fundamentals only) 3-Phase Induction Motor: Constructional features, Principle of Operation (Basic fundamentals only)

UNIT-IV:

P-N Junction Diode - Diode equation, Energy Band diagram, V-I characteristic, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit.

R18-Regulations

Rectifiers and Filters - The P-N junction as a rectifier - A Half Wave Rectifier, Ripple Factor, Full Wave Rectifier, Bridge Rectifier, Filters – Inductor Filters, Capacitor Filters, Lsection Filters, π - section Filters.

UNIT-V:

Bipolar Junction Transistor (BJT) - Construction, Principle of Operation, CB, CE and CC configurations. Junction Field Effect Transistor - Construction, Principle of Operation, V-I Characteristic, Comparison of BJT and FET, Zener Diode and SCR Devices- Zener diode characteristics, Use of Zener diode as simple regulator, Breakdown Mechanisms in Zener diode, Principle of Operation of SCR.(Basic fundamentals only)

TEXT BOOKS:

- 1. Electronic Devices and Circuits R.L. Boylston and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
- 2. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
- 3. Electrical Machines by P.S.Bimbra

REFERENCES:

- 1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
- 2. Electronic Devices and Circuits K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
- 3. Electrical Machines by J.B.Gupta.
- 4. Network Theory by N.C.Jagan&C.Lakshminarayana, B.S. Publications.
- 5. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

Course Outcomes: After the course completion, the students are able to:

- 1. Learn Basic circuit concepts such as electrical parameters, quantities, laws and network reduction techniques and apply the network theorems with DC excitation in the systems
- 2. Analyze the steady state operation of single phase and three phase AC circuits and study the relationship between voltage and current for delta and star connections
- 3. Explore the construction, working, control and testing of various DC and AC Machines
- 4. Gain knowledge on basic electronic devices such as P-N junction Diode, rectifiers and filter with their V-I characteristics.
- 5. Acquire extended knowledge on next generation of electronic devices such transistors, zener diode and SCR devices

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME03) METALLURGY AND MATERIAL SCIENCE

B.Tech: III-Semester-Mech. Engg.

L T P C 3003

Pre-Requisites: None

COURSE OBJECTIVES:

1. To Understand the bond formation, grains and grain boundaries in crystalline metals .Develop new materials using equilibrium diagram and lever rule applicable in calculating the liquid and solid percentage.

2. To Apply heat treatment process to different materials to get required properties.

3. To Gain knowledge about advanced materials like composites and ceramics.

4. To Know the selection of heat treatment processes for different materials.

5. To study the properties & applications of cast iron & steels.

UNIT – I

Structure of Metals: 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 Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT –II

Equilibrium 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, Bi-Cd, Cu-Au, Cu-Sn 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.

$\mathbf{UNIT} - \mathbf{IV}$

Heat treatment of Alloys: Effect of alloying elements on Fe-Fe3C system, Annealing, Normalizing, Hardening, TTT diagrams, tempering, Hardeneability, surface hardening methods, Age hardening treatment, Cryogenic treatment of alloys.Non-ferrous Metals and Alloys: Structure and properties of copper and its alloys, Aluminum and its alloys, Titanium and its alloys.

UNIT – V

Ceramic materials: Crystalline ceramics, glasses, cermets, abrasive materials, nonmaterial's – definition, properties and applications of the above.

Composite materials: Classification of composites, various methods of component manufacture of composites, particle – reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal – matrix composites and C - C composites.

Text Books:

- 1. Introduction to Physical Metallurgy / Sidney H. Avener.
- 2. Material Science & Metallurgy / Kodgire

Reference Books:

- 1. Science of Engineering Materials / Agarwal
- 2. Materials Science / Vijendra Singh
- 3. Elements of Material Science / V. Rahghavan
- 4. An introduction to Material Science / W.G.Vinas & H.L. Mancini
- 5. Material Science & Material / C.D.Yesudian & Harris Samuel
- 6. Engineering Materials and their Applications R. A Flinn and P K Trojan / Jaico Books.

Course Outcomes:

The students will be able to

- 1. Understand the bond formation, grains and grain boundaries in crystalline metals.
- 2. Apply lever rule in calculating the liquid and solid percentage.
- 3. Apply heat treatment processes to different materials to get required properties.
- 4. Gain knowledge about advanced materials like composites & ceramics.
- 5. Analyze the applications and the properties of cast irons and steels.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

(B18ME04) MECHANICS OF SOLIDS

B.Tech: III-Semester-Mech. Engg.

L T P C 3 1 0 4

Pre Requisites: ENGINEERING MECHANICS-I & II

COURSE OBJECTIVES:

- 1. Gain a fundamental understanding of the concepts of stress and strain by analysis of solids and structures.
- 2. Learn shear force & bending moment concept for different beams under different loads.
- 3. Learn bending stress & shear stress concept for different beams under different loads.
- 4. Learn the concept of deflection & slope of the different beams.
- 5. Learn the concept of stresses in thin & thick cylinders.

UNIT-I

SIMPLE STRESSES AND STRAINS : Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – 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.

UNIT-II

SHEAR FORCE AND BENDING MOMENT : Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads , UDL, gradually varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT-III

FLEXURAL STRESSES:

Theory of simple bending – Assumptions Derivation of bending equation: M/I=f/y=E/R, Neutral axis – Determination of bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T & angle sections.

UNIT-IV

TORSION OF CIRCULAR SHAFTS: Theory of Pure Torsion- Derivation of Torsion equation: $T/J=q/r=N\theta/L$ - Assumptions made in the theory of pure torsion- Torsional Moment of resistance – Polar Section modulus- Power transmitted by shafts- Combined bending , torsion and end thrust- Design of shafts according to theories of Failure.

THIN CYLINDERS : Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strain – changes in diameter, length and volume of thin cylinders – Riveted boiler shells – Thin spherical shells. THICK CYLINDERS – lame's equation – cylinders subjected to inside and outside pressures – compound cylinders.

UNIT-V

DEFLECTION 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, - U.D.L. gradually varying load. Mohr's theorems – Moment Area method – application to simple cases including overhanging beams.

TEXT BOOKS :

- 1. Strength of Materials by Andrew Pytel and Ferdinond L. Singer Longman
- 2. Strength of Materials by Jondar : Galgotia Publications
- 3. Strength of Materials by Ramamrutham.

REFERENCES :

- 1. Strength of Materials by Bansal, Lakshmi Publications
- 2. Strenght of Mateirals by S. Tumoshenko
- 3. Strength of Materials by R.S. Khurmi; S. Chand & Co. 2005

COURSE OUTCOMES:

The students will be able to

- 1. Understand the concepts of stress and strain in mechanics of solids and material properties.
- 2. Apply the fundamental concepts of shear force & bending moment for Cantilever beam, simply supported beam & overhanging beam with point loads, UDL, gradually varying loads & their combination.
- 3. Apply the fundamental concepts of Bending stresses & shear stresses for different Beams.
- 4. Apply the different methods to determine the deflection & slope of different beams like double integration method, Area moment method & Macaulay's method
- 5. Apply the Lame's equation to determine stresses in Thick cylinders. To understand the concept of torsion and its application to circular shafts.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME05) THERMODYNAMICS

B.Tech: III-Semester- Mech. Engg.

L T P C 3 0 0 3

Pre-Requisites: None

COURSE OBJECTIVES:

- 1. To Understand basic concepts of thermodynamics like system, property, state, process, cycle and continuum.
- 2. To Know the concept of quasi-static process, reversibility, causes of irreversibility and understand the concept of temperature through zeroth law of thermodynamics.
- 3. To apply first law of thermodynamics for different thermal systems and understand the concept of entropy through second law of thermodynamics.
- 4. Understand the properties of pure substances and able to use mollier diagram and steam table.
- 5. Quantify the behavior of perfect and real gases and able to calculate different properties of mixtures of perfect gases.
- 6. Analyze different power cycles and able to evaluate their performance parameters.

UNIT I

Introduction: Basic Concepts:System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Types, Displacement & Other forms of Work, Heat, Point and Path functions, Zeroth Law of Thermodynamics – Concept of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale

UNIT II

PMM I - Joule's Experiments – First law of Thermodynamics – Corollaries – First law applied to a Process – applied to a flow system – Steady Flow Energy Equation.Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its analysis, Thermodynamic scale of Temperature, clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation, Availability and Irreversibility – Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics

UNIT III

Pure Substances, P-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations – Triple point at critical state properties during change of phase, Dryness Fraction – Clausius – Clapeyron Equation Property tables. Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry.

Perfect Gas Laws – Equation of State, specific and Universal Gas constants – various Nonflow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy – Throttling and Free Expansion Processes – Flow processes

UNIT IV

Deviations from perfect Gas Model – Vander Waals Equation of State – Compressibility charts – variable specific Heats – Gas Tables

Mixtures of perfect Gases – Mole Fraction, Mass fraction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction, Volume fraction and partial pressure, Equivalent Gas const and Molecular Internal Energy, Enthalpy, specific Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air.

UNIT – V

Power Cycles : Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericsson Cycle, Lenoir Cycle – Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – comparison of Cycles. Brayton and Rankine cycles – Performance Evaluation – combined cycles.

Text Books:

- 1. Engineering Thermodynamics / PK Nag /TMH, III Edition
- 2. Thermodynamics / C.P.Arora.

Course Outcomes:

The students will be able to

- 1. Understand the basic thermodynamic principles and their applications
- 2. Apply the laws of thermodynamics for different thermal systems.
- 3. Use mollier diagram and steam tables to find the properties of pure substances.
- 4. Calculate different properties of perfect gases, real gases and mixtures of perfect.
- 5. Analyse different power cycles.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS) (B18ME06) MACHINE DRAWING

B.Tech: III-Semester-Mech. Engg.

L T P C 1 0 2 2

Pre-Requisite: Engineering Graphics I&II

Course Objectives:

- 1. Understand basics of drawing and represent any matter/object with the help of technical drawings.
- 2. Produce orthographic drawing of different machine parts.
- 3. Draw the sectional views of machine parts
- 4. Develop skill to produce assembly drawings.
- 5. Develop skill to produce detailed drawings of machine parts from assembly drawing.
- 6. Prepare and read the blueprint of drawings of machine parts.

Machine Drawing Conventions:

Need for drawing conventions – introduction to ISI conventions

- 1. Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
- 2. Types of sections selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
- 3. Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
- 4. Title boxes, their size, location and details common abbreviations and their liberal usage
- 5. Types of Drawings working drawings for machine parts.
- 6. Conventional representation of electrical, electronic, hydraulic and pneumatic circuits.
- 7. Introduction and indication of the tolerances of form and position on drawings Types of surface roughness indication- surface roughness symbols obtainable from various manufacturing processes Heat treatment and surface treatment.

Drawing of Machine Elements and simple parts, Selection of Views, additional views for the following machine elements and parts with every drawing proportion.

- 6. Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
- 7. Keys, cottered joints and knuckle joint.
- 8. Riveted joints for plates
- 9. Shaft coupling, spigot and socket pipe joint.
- 10. Journal, pivot and collar and foot step bearings.

R18-Regulations

Assembly Drawings:

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

- 11. Steam engine parts stuffing boxes, cross heads, Eccentrics.
- 12. Machine tool parts: Tail stock, Tool Post, Machine Vices.
- 13. Other machine parts Screws jacks, Petrol engine connecting rod, Plumber block

Part Drawings:

Drawings of parts from assembly drawings with indications of size, tolerances, roughness, form and position errors etc.

- 14. Steam engine parts stuffing boxes, cross heads, Eccentrics.
- 15. Machine tool parts Tail stock, Tool Post, Machine Vices.
- 16. Couplings Universal and Flange couplings.

NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

Text Book :

1. Machine Drawing -K.L.Narayana/ Wiley Eastern.

Reference Books :

Machine Drawing – P.S.Gill.
Machine Drawing – Junnarkar N.D./ Pearson Edu.

Course Outcomes:

The students will be able to

- 1. Understand various conventions used in machine drawing
- 2. Prepare the assembly and part drawings from component drawing.
- 3. Identify the use of various machine components.
- 4. Interpret and make conclusions about a given drawing.
- 5. Apply the First angle projection

R18-Regulations

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME07) MECHANICS OF SOLIDS AND METALLURGY LAB

B.Tech: III-Semester-Mech. Engg.

L T P C 0 0 3 1.5

Course Objectives:

- 1. To know the micro structural analysis of pure metals like Iron, Cu and AI.
- 2. To know the micro structural analysis of Mild steels, low carbon steels, high carbon steels.
- 3. To know the micro structural analysis of Cast Irons.
- 4. To know the hardness of the various materials with respect to heat treatment
- 5. To Study the analysis of various beams deflection.
- 6. To know the properties of various materials by testing methods
- 7. Understand the operations of UTM, Impact test, Torsion test, Metallographic study and etching processes etc.

(A) METALLURGY:

- 1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and AL.
- 2. Preparation and study of the Microstructure of Mild Steels, medium carbon steels and high carbon steels.
- 3. Study of the Micro Structure of Cast Irons.
- 4. Study of the Micro Structures of Non-Ferrous alloys.
- 5. Study of the Micro structures of Heat treated steels.
- 6. Hardeneability of steels by Jominy End Quench Test.
- 7. To find out the hardness of various treated and untreated steels.

(B) MECHANICS OF SOLIDS LAB:

- 1. Direct tension test.
- 2. Bending test on
 - a) Simple supported beam.
 - b) Cantilever beam.
- 3. Torsion test.
- 4. Hardness test.
 - a) Brinells hardness test
 - b) Rockwell hardness test.
- 5. Test on springs.
- 6. Compression test on cube.
- 7. Impact test.

Course Outcomes:

The students will be able to

- 1. Identify grain and grain boundary, crystal structure of different materials.
- 2. Study the microstructure of various materials.
- 3. Analyze the correlation between Mechanical and Metallurgical properties.
- 4. Perform material testing and analyze various material properties.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME08) FUELS AND LUBRICANTS LAB

B.Tech: III-Semester- Mech. Engg.

L T P C 0 0 2 1

Pre-Requisites: None

Course Objectives:

- 1. To know the flash point & fire point of liquid fuels like petrol & diesel.
- 2. To know carbon percentage in liquid fuels.
- 3. Learn Viscosity of different liquid lubricants.
- 4. Learn the concept of Calorific value of Fuels.

Experiments:

- 1. Determination of Flash and Fire points of Liquid fuels/Lubricants.
- 2. Carbon residue test: Liquid fuels.
- 3. Viscosity determination by Redwood & Say bolt methods
- 4. Determination of Calorific value: Solid/Liquid/Gaseous fuels with Bomb/ Junkers Gas Calorimeter.
- 5. Grease penetration test.

Course Outcomes:

The students will be able to

- 1. Apply different methods to determine the flash point & fire point of liquid fuels.
- 2. Apply carbon residue test to determine carbon% in liquid fuels.
- 3. Apply Different methods to determine viscosity of Liquid lubricants.
- 4. Apply different methods to determine the calorific value of fuels.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18EE03) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

B.Tech: III-Semester (Common to Mechanical, Civil) L T P C 0 0 3 1.5

Pre-Requisites: None

LIST OF EXPERIMENTS

- 1. Verification of Kirchhoff"s Laws.
- 2. Verification of Superposition and Reciprocity Theorems.
- 3. Verification of Thevenin's and Maximum Power transfer theorem.
- 4. Speed Control of DC Shunt Motor.
- 5. Swinburne's Test on DC shunt machine.
- 6. Brake test on DC shunt motor.
- 7. OC & SC tests on single phase transformer.
- 8. PN Junction Diode characteristics (Forward bias & Reverse bias).
- 9. Transistor CE Characteristics (Input and Output)
- 10. Rectifier with and without filters (Full wave & Half wave)

Course outcomes: After the course completion, the students are able to

- 1 Learn to simplify complex electric and electronic circuits by applying the KVL and KCL laws
- 2 Identify the optimal loading on the system.
- 3 Analyze the performance of DC machines
- 4 Identify and analyze the performance and operation of semi conducting devices.

R18-Regulations

L T P C 2 0 0 0

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

(B18MC04) INDIAN CONSTITUTION

B.Tech: III-Semester

Course objectives:

- 1. To introduce the concepts and features Indian constitution.
- 2. To identify the core values reflected in Preamble of the Constitution.
- 3. To examine the nature of the Indian federal system and the parliamentary form of government.

Learning outcome:

Students are able to understand the rights and duties of a citizen. This subject elevates the knowledge of student regarding the government and administration and also know the roles and powers of members of both the houses in the central and states. It also provides the knowledge about local administration with respect to municipalities and ZPs. It also gives the knowledge about election commission.

UNIT-I

Introduction to Constitution: meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha

UNIT-III

State Government and its Administration Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-IV

Local Administration District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayatiraj: Introduction, PRI: Zilla parishadh, Elected officials and their roles, CEO Zila parishadh: Position and role, Block level: Organizational Hierarchy (Different departments) village level: Role of Elected and Appointed officials, Importance of grass root democracy

UNIT- V

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and bodies for the welfare of SC/ST/OBC and women.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MC07) GENDER SENSITIZATION Towards A World of Equals

B.Tech: IV-Semester-Mech. Engg.

L T P C 2 0 0 0

Course Objectives:

- 1. To develop students' sensibility with regard to issues of gender in contemporary India.
- 2. To provide a critical perspective on the socialization of men and women.
- 3. To introduce students to information about some key biological aspects of genders.
- 4. To expose the students to debates on the politics and economics of work.
- 5. To help students reflect critically on gender violence.
- 6. To expose students to more egalitarian interactions between men and women.

Unit – 1

Gender: Why Should We Study It?

Unit – 2

Socialization: Making Women, Making Men

- 2.1 Introduction
- 2.2 Preparing for womanhood
- 2.3 Growing up male
- 2.4 First lessons in caste
- 2.5 Different masculinities

Unit – 3

Housework: The Invisible Labour

- 3.1 "My mother does not work"
- 3.2 "Share the load"

Unit – 4

Missing Women: Sex Selection and Its consequences

- 4.1 Declining sex ratio
- 4.2 Demographic consequences

R18-Regulations

Unit – 5

Knowledge: Through the Lens of Gender

- 5.1 Point of view
- 5.2 Gender and the structure of knowledge
- 5.3 Further reading: Unacknowledged women artists of Telangana

Unit – 6

Sexual Harassment: Say No!

- 6.1 Sexual harassment, not eve-teasing
- 6.2 Coping with everyday harassment
- 6.3 Further reading: "Chupulu"

Unit – 7

Women' Work: Its Politics and Economics

- 7.1 Fact and fiction
- 7.2 Unrecognized and unaccounted work
- 7.3 Further reading: Wages and conditions of work

Unit – 8

Domestic Violence: Speaking Out

- 8.1 Is home a safe place?
- 8.2 When women unite [Film]
- 8.3 Rebuilding lives
- 8.4 Further reading: New forums for justice

Unit – 9

Whose History? Questions for Historians and Others

- 9.1 Reclaiming a past
- 9.2 Writing other histories
- 9.3 Further reading: Missing pages from modern Telangana history

Unit – 10

Gender Spectrum: Beyond the Binary

- 10.1 Two or many?
- 10.2 Struggles with discrimination

R18-Regulations

Unit – 11

Thinking about Sexual Violence

- 11.1 Blaming the victim
- 11.2 "I fought for my life..."
- 11.3 Further reading: The caste face of violence

Unit – 12

Just Relationships: Being Together as Equals

- 12.1 Mary Kom and Onler
- 12.2 Love and acid just do not mix
- 12.3 Love letters
- 12.4 Mothers and fathers
- 12.5 Further Reading: Rosa Parks The braveheart

Unit – 13

Additional Reading: Our Bodies, Our Health

Course Outcomes:

- 1. Students will have developed a better understanding of important issues related to gender in contemporary India.
- 2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and films.
- 3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter them.
- 4. Students will acquire insights into the gendered division of labour and its relation to politics and economics.
- 5. Men and women students and professionals will be better equipped to work and live in harmony. Students will develop a sense of appreciation of women in all walks of life.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MA05) PROBABILITY & STATISTICS

B.Tech: IV-Semester

LTPC 3104

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

To learn

1. The ideas of probability and random variables and various discrete and continuous probability

distributions and their properties.

2. The basic ideas of statistics including measures of central tendency, correlation and regression.

3. The statistical methods of studying data samples.

UNIT-I: Basic Probability

Probability spaces, conditional probability, independent events and Bayes' theorem. Random variables: Discrete and continuous random variables, Expectation of Random Variables, Moments, Variance of random variables, Chebyshev's Inequality.

UNIT-II: Discrete Probability distributions

Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution.

UNIT-III: Continuous Random variable & Distributions

Continuous random variables and their properties, distribution functions and densities, Normal, exponential and gamma distributions, evaluation of statistical parameters for these distributions.

UNIT-IV: Applied Statistics

Curve fitting by the method of least squares: Fitting of straight lines, second degree parabolas and more general curves, Correlation and regression, Rank correlation.

UNIT-V: Testing of Hypothesis

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, Test for single mean, difference of means for small samples, test for ratio of variances for small samples.

Course Outcomes:

Students who successfully complete this course should be able to:

- 1. Use probability theory and deals with modelling uncertainty and apply discrete and continuous probability, in order to evaluate the probability of real world events.
- 2. Develop discrete probability distributions and its applications, and use these techniques to generate data from Binomial and Poisson Distributions.
- 3. Develop continuous probability distributions and its applications, and use these techniques to generate data from Normal Distribution.
- 4. Perform correlation analysis, in order to estimate the nature and the strength of the linear relationship that may exist between two variables of interest, Perform regression analysis to estimate the magnitude of change in one variable due to a given change in the other variable.
- 5. Construct confidence interval estimates for population parameters and conduct hypothesis tests concerning population parameters, for single and multiple populations based on sample data. And also perform Student T-test, F-test and X²- test(chi-square).

TEXT BOOKS

- 1. Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye.
- 2. Fundamentals of Mathematical Statistics, Sultan Chand & Sons Publications, S C Guptha and V.K. Kapoor.

REFERENCES

- 1. Probability and Statistics for Engineers, 8th Edition, Miller and Freund's, Pearson Educations.
- 2. A First Course in Probability, 6th Ed., Pearson Education India, 2002, S. Ross.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME09) FLUID MECHANICS & HYDRAULIC MACHINERY

B.Tech: IV-Semester

L T P C 3 0 0 3

Pre-Requisites: None

COURSE OBJECTIVES:

- 1. Understand the properties of fluids and flow characteristics. Determine pressure variation in a flowing fluid using Bernoulli's principle.
- 2. Determine velocity and acceleration of a fluid at a point. Apply the different conservation equations of mass, momentum and energy to fluid flow problems.
- 3. Apply basic fluid mechanics principles to the flow of viscous fluids in pipes and ducts. Calculate the head losses in simple pipes and channels.
- 4. Describe the construction and working of turbines and pumps. Determine optimum speed for pump operation.
- 5. Determine radial and axial forces on impeller. Understand centrifugal pump impeller design.

UNIT I

Fluid Statics: Dimensions and Units: physical properties of fluids-specific gravity, viscosity, and surface tension vapour pressure and their influence on fluid motion-atmospheric, gauge and vacuum pressure- measurement of pressure- piezometer, U-Tube and Differential Manometers.

UNIT II

Fluid kinematics: stream line, path line and streak line, classification of flows steady & un steady, uniform & non uniform, laminar & turbulent, rotational & irrotational flows-equation of continuity for one dimensional flow and three dimensional flow.

Fluid dynamics: Surface & body forces Euler's & Bernoulli's equations for flow along a stream line, momentum equation and its applications on force on pipe bend. Measurement of flow: Pitot tube, venture meter and orifice meter, flow nozzle.

UNIT III

Closed conduit flow: Reynold's experiment-Darcy Weisbach equation-minor losses in pipespipes in series and pipes in parallel-total energy line-hydraulic gradient line.

Boundary layer concepts: Definition, thicknesses, characteristics along thin plate, laminar and turbulent boundary layers (No derivations) boundary layer in transition, separation of boundary layers submerged objects-drag and lift.

UNIT IV

Hydraulic Turbines & Turbo Machinery: Hydro dynamic force on jets on stationary and moving plate, inclined and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

Classification of turbines, heads and efficiencies, impulse and reaction turbines, Pelton wheel, Francis turbine, and Kaplan turbine-working proportions, work done, efficiencies, hydraulic design-draft tube theory-functions and efficiency.

UNIT V

Performance of hydraulic turbines and pumps: Geometric similarity, unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbines, cavitation, surge tank, water hammer.

Centrifugal pumps: Classification, working, work done-barometric head-losses and efficiencies specific speed-performance characteristic curves, NPSH.

Reciprocating pumps: Working, discharge, slip, indicator diagrams.

TEXT BOOKS:

- 1. Hydraulics, Fluid mechanics and hydraulic machinery by MODI and SETH
- 2. Fluid mechanics and hydraulic machines by Bansal

REFERENCES:

- 1. Fluid mechanics and fluid power engineering by D.S.Kunar, Kotaria and sons.
- 2. Fluid mechanics and machinery by D. Rama Durgaiah, New age international.
- 3. Hydraulic machines by Banga and Sharma, Khanna publishers

COURSE OUTCOMES:

The students will be able to

1. Apply mathematics and basic sciences and translates this knowledge to understand fluid flow principles

and their applications.

- 2. Understand fundamental knowledge of the mechanics of fluid at rest and in motion.
- 3. Observe fluid phenomena by developing and using the principles, laws
- 4. Analyze fluid interactions with natural and constructed systems.
- 5. Associate fundamental knowledge & performance of different turbines & pumps.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

(B18ME10) THERMAL ENGINEERING-I

B.Tech: IV-Semester

L T P C 3003

Pre-Requisite:

THERMODYNAMICS

COURSE OBJECTIVES:

- 1. Demonstrate the differences between air standard cycles and actual cycles.
- 2. Understand the working principle of internal combustion engine and its components details, fuel injection carburetor.
- 3. Differentiate normal and abnormal combustion in spark ignition engines.
- 4. Know various stages of combustion in compression ignition engines, diesel knock.
- 5. Solve problems on performance of engines, brake power, mechanical efficiency, and specific fuel consumption.
- 6. Understand constructional details and working principle of different types of compressors.

UNIT – I

I.C. Engines:

Classification - Working principles of Four & Two stroke engine, SI & CI engines, Valve and Port Timing Diagrams, Air – Standard, air-fuel and actual cycles - Engine systems – Carburetor and Fuel Injection Systems for SI engines, Fuel injection systems for CI engines, Ignition, Cooling and Lubrication system, Fuel properties and Combustion Stoichiometry.

UNIT – II

Normal Combustion and abnormal combustion in SI engines – Importance of flame speed and effect of engine variables – Abnormal combustion, pre-ignition and knocking in SI Engines – Fuel requirements and fuel rating, anti knock additives – combustion chamber – requirements, types of SI engines. Four stages of combustion in CI engines – Delay period and its importance – Effect of engine variables – Diesel Knock– Need for air movement, suction, compression and combustion induced turbulence in Diesel engine – open and divided combustion chambers and fuel injection– Diesel fuel requirements and fuel rating

UNIT III

Testing and Performance of IC engines:

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 and chart

UNIT – IV

R18-Regulations

Classification of compressors – Fans, blowers and compressors – positive displacement and dynamic types – reciprocating and rotary types. volumetric efficiency and effect of clearance volume, staged compression, under cooling, saving of work, minimum work condition for staged compression Rotary Compressor (Positive displacement type): Roots Blower, vane sealed compressor, Lysholm compressor – mechanical details and principle of working – efficiency considerations.

$\mathbf{UNIT} - \mathbf{V}$

Dynamic Compressors: Centrifugal compressors: Mechanical details and principle of operation – velocity and pressure variation. Energy transfer-impeller blade shape-losses, slip factor, power input factor, pressure coefficient and adiabatic coefficient – velocity diagrams – power.

Axial Flow Compressors: Mechanical details and principle of operation – velocity triangles and energy transfer per stage degree of reaction, work done factor - isentropic efficiencypressure rise calculations – Polytropic efficiency.

Text Books:

- 1. I.C. Engines / V. Ganesan- TMH
- 2. Thermal Engineering / Rajput / Lakshmi Publications.
- 3. Thermal Engineering / P.K.Nag

Reference Books:

- 1. IC Engines Mathur & Sharma Dhanpath Rai & Sons.
- 2. Engineering fundamentals of IC Engines Pulkrabek / Pearson /PHI
- 3. Thermal Engineering / Rudramoorthy TMH
- 4. Thermodynamics & Heat Engines / B. Yadav/ Central Book Depot., Allahabad
- 5. I.C. Engines / Heywood /McGrawHIII.
- 6. Thermal Engineering R.S. Khurmi & J.K.Gupta S.Chand

Course Outcomes:

The students will be able to:

- 1. Understand the concept and working of two and four strokes I.C. engines.
- 2. Analyse the normal and abnormal condition for the combustion of SI and CI engines also the parameters which effect the combustion characteristics.
- 3. Able to calculate the performance of the engine with different parameters.
- 4. Get knowledge about compressors and their classifications.
- 5. Differentiate various compressor on the basis of their working and requirement and can use suitable one.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME11) KINEMATICS OF MACHINES

B.Tech: IV-Semester

L T P C 4004

Pre-Requisite: Engineering Mechanics I & II

COURSE OBJECTIVES:

- 1. To understand the concept of machines, mechanisms and related terminologies.
- 2. To able to analyze a mechanism for displacement, velocity and acceleration at any point in a moving link.
- 3. To understand the theory of gears, gear trains.
- 4. To understand the theory of cams.
- 5. To understand the different steering gear mechanisms,
- 6. To understand power drives.

UNIT-I

Mechanisms : Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematics pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully and incompletely constrained . Mechanism and Machines – Mobility of Mechanisms: Grubler's criterion, classification of machines – kinematic chain – inversions of mechanism – inversions of quadric cycle chain, single and double slider crank chains. Mechanical advantage.

UNIT-II

Straight-line motion mechanisms: Exact and approximate copied and generated types – Peaucellier - Hart - Scott Russel – Grasshopper – Watt -Tchebicheff's and Robert Mechanism – Pantograph. Steering gears: Conditions for correct steering – Davis Steering gear, Ackerman's steering gear.

Hooke's Joint: Single and double Hooke's joint -velocity ratio - application - problems.

UNIT-III

Kinematics: Velocity and acceleration – Motion of link in machine – Determination of Velocity and acceleration – Graphical method – Application of relative velocity method. Plane motion of body: Instantaneous center of rotation- centrodes and axodes – Three centers in line theorem – Graphical determination of instantaneous center, determination of angular velocity of points and links by instantaneous center method. Kliens construction - Coriolis acceleration - determination of Coriolis component of acceleration Analysis of Mechanisms:

R18-Regulations

Analysis of slider crank chain for displacement- velocity and acceleration of slider – Acceleration diagram for a given mechanism.

UNIT-IV

Cams: Definitions of cam and followers – their uses – Types of followers and cams – Terminology – Types of follower motion - Uniform velocity, Simple harmonic motion and uniform acceleration and retardation. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases.

UNIT – V

Higher pair: Friction wheels and toothed gears – types – law of gearing, condition for constant velocity ratio for transmission of motion – velocity of sliding Forms of teeth, cycloidal and involutes profiles – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference – expressions for arc of contact and path of contact of Pinion & Gear and Pinion & Rack Arrangements–

Introduction to Helical – Bevel and worm gearing Gear Trains: Introduction – Types – Simple – compound and reverted gear trains – Epicyclic gear train. Methods of finding train value or velocity ratio of Epicyclic gear trains. Selection of gear box - Differential gear for an automobile.

Text Books:

- 1. Theory of Machines /S.S.Rattan Tata McGraw Hill Publishers.
- 2. Kinematics & Dynamics Of machinery/Norton/TMH

Reference Books:

- 1. Theory of Machines / Thomas Bevan/CBS
- 2. Theory of Machines / Sadhu Singh / Pearson.
- 3. Theory of Machines / Shigley / Oxford
- 4. Mechanism and Machine Theory / JS Rao and RV Duggipati / New Age
- 5. Theory of Machines by / R.K. Bansal (Lakshmi Publications).

COURSE OUTCOMES:

The students will be able to

- 1. Identify the basic mechanisms involved in machines.
- 2. Develop familiarity with application of kinematics theories to real-world machines.
- 3. Identify the basic relations between distance, time, velocity and acceleration.
- 4. Understand analytical linkage analysis, determine cam profiles
- 5. Analyze gear trains and gear profiles.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

(B18ME12) PRODUCTION TECHNOLOGY

B.Tech: IV-Semester

Pre-Requisites: None

COURSE OBJECTIVES:

1. Student will be able to understand the principles of casting, welding processes.

2. Student will be able to understand the principles of metal forming processes.

3. The student will be able to understand the principles of various manufacturing processes and to apply them in producing industrial products economically.

4. Students will get the knowledge of Inert gas welding, TIG & MIG.

5. Students will get the knowledge of advanced welding technologies like, friction welding, Induction welding.

6. Students will able to understand the process of extrusion of metals - Types, Applications

UNIT – I

Casting : Steps involved in making a casting – Advantage of casting and its applications;

Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands. Methods of Melting - Crucible melting and cupola operation – Defects in castings, Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting, shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design.

Solidification of casting – Solidification of pure metal – Nucleation and grain growth, casting design considerations

UNIT – II

Welding: Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting – standard time and cost calculations. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.

UNIT – III

Inert Gas Welding _ TIG Welding, MIG welding, Friction welding, induction welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non- destructive testing of welds.

L T P C 3 0 0 3

UNIT – IV

Hot working, cold working, strain hardening, recovery, recrystallization and grain growth. Rolling fundamentals – theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements Stamping, forming and other cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning. Types of presses and press tools. Forces and power requirement in the above operations.

UNIT – V

Extrusion of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion - Impact extrusion - Extruding equipment - Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion Forging Processes: Forging operations and principles - Tools - Forging methods - Smithforging, Drop Forging - Roll forging - Forging hammers: Rotary forging - forging defects - cold forging, swaging, Forces in forging operations.

TEXT BOOKS:

1. Manufacturing Technology / P.N. Rao/TMH

REFERENCE BOOKS:

- 1. Production Technology / R.K. Jain
- 2. Metal Casting / T.V Ramana Rao / New Age
- 3. Principles of Metal Castings / Rosenthal.
- 4. Welding Process / Parmar /
- 5. Production Technology /Sarma P C /
- 6. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.

COURSE OUTCOMES:

The students will be able to

- 1. Apply the knowledge of casting, welding joints and forces and power requirements in metal forming processes.
- 2. Relate the melting, solidification, pattern allowances, gating and riser design of mold cavity, aspects of casting.
- 3. Understand basic calculations of forces and power requirements in the metal forming operations.
- 4. Differentiate the application of welding using the arc welding, gas welding, resistance welding, soldering and brazing.
- 5. Survey the defects occurring in forging operation.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME13) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

B.Tech: IV-Semester

L T P C 0 0 3 1.5

Pre-Requisites: None

COURSE OBJECTIVES:

- 1. Calculate different parameters such as coefficient of friction, coefficient of discharge, coefficient of impact, power, efficiency etc. of various experiments.
- 2. Determine pressure variation in a flowing fluid using Bernoulli's principle applications such as Venturimeter, orifice meter.
- 3. Apply basic fluid mechanics principles to the flow of water in pipes, pumps and turbines.
- 4. Calculate the head losses and friction in pipes.
- 5. Test the performance of turbines and pumps.
- 6. Evaluate the forces and their impact of jet on flat and curved vanes.

EXPERIMENTS:

- 1. Calibration of Venturimeter & Orifice meter
- 2. Determination of Coefficient of discharge for a small orifice by a constant head method.

3. Determination of Coefficient of discharge for an external mouth piece by variable head method.

- 4. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
- 5. Performance test on single stage centrifugal pump
- 6. Performance test on reciprocating pump
- 7. Impact of jet on vanes
- 8. Performance test on Pelton wheel.
- 9. Performance test on Francis Turbine
- 10. Performance test on Kaplan Turbine
- 11. Performance test on multi stage centrifugal pump
- 12. Drag and Lift Coefficients of an Aerofoil model.

Any ten of the above experiments are to be covered.

COURSE OUTCOMES:

The students will be able to

- 1. Apply knowledge of fluid mechanics and hydraulic machines and translates this knowledge for understanding fluid flow principles and their application to experiments.
- 2. Practical exposure by using components vacuum gauge, pressure gauge, manometers, pipes, motors, pumps & turbines.
- 3. Use comparison of theoretical values with the real parameters.
- 4. Know and understand the experimental analysis in turbines and pumps with parameters such as discharge, head of water, speed of brake drum.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME14) PRODUCTION TECHNOLOGY LAB

B.Tech: IV-Semester

L T P C 0 0 3 1.5

Pre-Requisites: None

COURSE OBJECTIVES:

Students will be able to

- 1. Know the experimental skills of various production processes.
- 2. Learn casting process, welding process.
- 3. Learn extrusion process.
- 4. Learn the processing of plastics.
- 5. Know the welding basics and concept of various process of welding.

EXPERIMENTS:

METALS CASTING LAB:

- 1. Moulding 2 Exercises
- 2. Melting & Casting Demonstration
- 3. Pattern Marking 1 Exercise

WELDING LAB:

- 1) Arc Welding:
- a) Effect of polarity on welds strength & Heat affected zone
- b) Effect of current on weld strength and Heat affected zone
- 2) Spot Welding Effect of current on weld strength.
- 3) Gas welding

MECHANICAL PRESS WORKING:

- 1) Blanking & Piercing operation & Study of simple Compound and progressive press tools.
- 2) Hydraulic Press: Deep Drawing and Extrusion Operations.
- 3) Bending and other operations.

PROCESSING OF PLASTICS:

1) Injection Moulding

2) Blow Moulding

R18-Regulations

COURSE OUTCOMES:

The students will be able to

- 1. Understand basic knowledge and concepts of various experiments.
- 2. Perform joining of materials (similar/dissimilar) using welding.
- 3. Analyze the concepts of extrusion and design of die.
- 4. Operate injection molding and blow molding machines.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

(B18ME15) MACHINE TOOLS AND METAL CUTTING

B.Tech: V-Semester

COURSE OBJECTIVES:

L	Т	Р	С
3	0	0	3

- 1. Student will be able to understand construction and working of various machine tools like lathe, milling, shaping and drilling, grinding, planning machines etc.
- 2. Student will understand principles and economics of metal cutting and able to select the economical machining process.
- 3. Student will demonstrate the knowledge of various cutting tool materials and will be able to select or design cutting tool material and tool geometries for the machining process and work material.
- 4. Students will be able to select the optimum cutting parameters i.e. feed, cutting speed, depth of cut for particular machining process. They are also able to know the effective working of machines and surface quality of machines.
- 5. Students will learn to monitor cutting tool conditions through force transducers and surface finish inspection.

UNIT – I

ELEMENTARY TREATMENT OF METAL CUTTING THEORY:

Elements of cutting processes – Geometry of single point cutting tool, chip formation and types of chips – built up edge and its effects on chip breakers. Mechanics of orthogonal cutting – Merchant's Force diagram, cutting forces – cutting speeds, feed, depth of cut, tool life, tool wear, coolants, machinability – Tool materials.

UNIT – II

LATHE:

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

UNIT – III

SHAPING, SLOTTING AND PLANING MACHINES: Principles of working – Principal parts – specification classification, operations performed. Kinematic scheme of the shaping, slotting and planning machines, machining time calculations.

DRILLING AND BORING MACHINES – Principles of working, specifications, types, operations performed – tool holding devices – twist drill – Boring machines – Fine boring

R18-Regulations

machines – Jig Boring machine. Deep hole drilling machine. Kinematics scheme of the drilling and boring machines

UNIT – IV

MILLING: Principles of working – specifications – classifications of milling machines – Principal features of horizontal, vertical and universal milling machines –milling operations. Geometry of milling cutters – milling cutters – methods of indexing – Accessories to milling machines, kinematic scheme of milling machines.

GRINDING MACHINE – Fundamentals – Theory of grinding – classification of grinding machine – cylindrical and surface grinding machine – Tool and cutter grinding machine – special types of grinding machines – Different types of abrasives – bonds, specification of a grinding wheel and selection of a grinding wheel. Kinematic scheme of grinding machines.

UNIT – V

LAPPING, HONING AND BROACHING MACHINES: Comparison among grinding, lapping and honing. Kinematics scheme of Lapping, Honing and Broaching machines. Constructional features of speed and feed Units, machining time calculations

JIGS AND FIXTURES: Principles of design of Jigs and fixtures and uses. Classification of Jigs & Fixtures – Principles of location and clamping – Types of clamping & work holding devices. Typical examples of jigs and fixtures

COURSE OUTCOMES:

The students will be able to

- 1. Apply cutting mechanics to metal machining based on cutting force and power consumption.
- 2. Operate lathe, milling machines, drill press, grinding machines, etc.
- 3. Evaluate mach inability of different materials using specific cutting forces and surface finish.
- 4. Understand Principles of design of Jigs and fixtures.
- 5. Compare grinding, lapping and honing operations.

TEXT BOOKS:

- P.C. Sharma, "A text book of manufacturing Technology II", S. Chand, 2010, ISBN 13: 9788121928465.
- 2. Workshop Technology Vol II by B.S. Raghuvamsi.
- 3. Workshop Technology Vol II by J.K. Hazra choudary.

REFERENCE BOOKS:

- 1. P.N.Rao, "Manufacturing Technology" Vol.2, Metal Cutting and Machine Tools, TMH, 2009, Ed.2, ISBN Number: 0074631802.
- 2. R.K.Jain, "Production Technology" Khanna Publishers, 2001, ISBN Number: 978-8174090997.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME16) DYNAMICS OF MACHINERY

B.Tech: V-Semester

COURSE OBJECTIVES:

L	Т	Р	С
4	0	0	4

- 1. Analyze the motions of mechanisms, design mechanisms to obtain the desired motions, and analyze forces in machines & fundamentals of gyroscopic couple.
- 2. Understand the friction in clutches.
- 3. Understand the turning moment diagrams and flywheels, working of governors.
- 4. Understand the balancing of rotary and reciprocating masses.
- 5. Understand the fundamentals in different vibrations.
- 6. Analyze the effect of vibration of machine parts under the operating conditions.

UNIT – I

STATIC AND DYNAMIC FORCE ANALYSIS OF PLANAR MECHANISMS

Gyroscopic Introduction – Angular Motions – Gyroscopes – effect of precession – Conditions for equilibrium – Two, three and four force members – Inertia forces and D' Alembert's Principle – planar rotation about a fixed center.

UNIT – II

FRICTION

Clutches: Friction clutches – Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch. Torque and power loss due to friction.

Brakes and Dynamometers: Analysis of Simple block brake – Internal expanding brakeband brake of vehicle. Dynamometers – absorption and transmission types. General description and methods of operation.

UNIT – III

TURNING MOMENT DIAGRAM AND FLY WHEELS

Turning moment – Inertia Torque, connecting rod angular velocity and acceleration, crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design.

Governors: Watt, Porter and Proell governors, spring loaded governors – HartNell and Hartung with auxiliary springs, Sensitiveness, isochronisms and hunting- effort and power of the governors.

R18-Regulations

$\mathbf{UNIT} - \mathbf{IV}$

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 – Balancing of "V", multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing.

UNIT - V

VIBRATIONS

Free Vibration of mass attached to vertical spring – Simple problems on damped and forced vibration. Vibration Isolation & Transmissibility-Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

COURSE OUTCOMES:

The students will be able to

- 1. Analyze the forces and torques in mechanisms and machines in operation. Know the function of governors, clutches and bearings.
- 2. Compute the frictional torque in clutches and braking torque in brakes.
- 3. Design the flywheel for different IC engines.
- 4. Evaluate the balancing masses in rotary and reciprocating balancing.
- 5. Calculate the frequencies of different vibrations.

TEXT BOOKS:

- 1. SS Ratan, "Theory of Machines", Mc Graw Hill, 3rd Ed. 2009, ISBN Number 9780070144774.
- 2. R.S.Khurmi & J.K.Gupta, "Theory of Machines", Eurasia Publishing House 2012, ISBN Number: 978-8121925242.

REFERENCE BOOKS:

- 1. P.L. Ballaney, "Theory of Machines and Mechanisms", Khanna Publishers, 3rd Ed., 2003, ISBN Number: 978-8174091222.
- R.L. Norton, "Kinematics and Dynamics of Machinery", Mc. Graw Hill 1st Ed., ISBN Number: 978-0070144804
- Uicker, Pennock and Shigley, "Theory of Machines and Mechanisms", Oxford, 1st Ed. ISBN Number: 978-007014480

R18-Regulations

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME17) DESIGN OF MACHINE MEMBERS – I

B.Tech: V-Semester

COURSE OBJECTIVES:

- 1. Use references that provide tabulated physical and mechanical data that are useful for mechanical design engineers.
- 2. Select the material and its properties for the optimum design of a component.
- 3. Understand the design principles of various machine members and able to apply the principles in designing new parts as per its functional requirements.
- 4. Understand the theories of failures.
- 5. Apply theories of failures in defining the failure criteria of the part.
- 6. Design the various power drives suitable to transfer power requirements.

UNIT – I

INTRODUCTION

Definition, Types of design, General Considerations in the design – Design Procedure – Selection of Materials for design and manufacturing.

Stresses in Machine Members: Simple stresses – Combined stresses - stress strain relation – Various theories of failures – factor of safety – Design for strength and rigidity. The concept of stiffness in tension, bending, torsion and combined situations.

UNIT – II

Strength of Machine Elements Stress concentration – Theoretical stress Concentration factor – Fatigue stress concentration factor – Design for fluctuating stresses – Endurance limit – Estimation of Endurance strength – Goodman's line, Soderberg's line, Gerbers line.

UNIT – III

Design of fasteners Riveted joints – definition, types and design Failures in riveted joints, terminology used in riveted joints, lozenze joint, riveted joints with eccentric loads- Welded joints - definition, types and design – Bolted joints – Design of bolts with initial stresses – Design of joints under eccentric loading.

UNIT – IV

Keys, cotters and knuckle joints Design of keys-stresses in keys-cottered joints- spigot and socket, sleeve and cotter, jib and cotter joints-Knuckle joints.

UNIT – V

Shafts and Shaft Couplings

Shafts: Design of solid and hollow shafts for strength and rigidity – Design of shafts for combined bending and axial loads.

Shaft Coupling: Rigid couplings – Muff, Split muff and Flange couplings. Flexible couplings – Flange coupling (Modified) – One Case Study.


COURSE OUTCOMES:

The students will be able to

- 1. Design a particular machine element and make use of standards parts and dimensions using design data book.
- 2. Design of shafts, shaft couplings like flange couplings, flexible couplings.
- 3. Determine the Stresses and deflections of bolded joints, keys, cotters, knuckle joints.
- 4. Determine the Stresses and deflections of helical springs.
- 5. Design of riveted, welded joint and screwed joints.

TEXT BOOKS:

- P.Kannaiah / Machine Design / Sci-Tech, 4th Ed. 2012, / ISBN-13: 978-81-8371-151-7.
 Pandya and Shah / Machine Design / Charotar, 18th Ed., 2012, / ISBN, : 978-93-80358-51-2.

REFERENCE BOOKS:

- 1. Schaum Series, "Machine deign", Mc.Graw Hill, ISBN-13: 9780070255951.
- 2. R.S.Kurmi, J.K.Gupta, "Machine design", S. Chand, 14th Ed., ISBn Number-13: 9788121925372.
- 3. S.Md.Jalaludeen, "Machine Design", Publications, ISBN-13: Anuradha 9788189638214.

74

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME18) METROLOGY AND SURFACE ENGINEERING

B.Tech: V-Semester

COURSE OBJECTIVES:

- 1. To understand the basic principles of metrology this deals with the measuring instruments and the precision measurement techniques.
- 2. To apply these principles to analyze measurement problems.
- 3. To apply their knowledge to Gears, Surface engineering, Instrumentation.
- 4. To know the Measuring machines, Machine tool alignment, Screw threads, and Surface texture variations.
- 5. To learn limits, fits, tolerances, linear, angular measurements and comparators for the application of mechanical engineering components, parts, assembly, interchangeability, standards of measurement.
- 6. To use engineering metrology principles to design 'Go' and 'No-Go' gauges.

UNIT – I

SYSTEM OF LIMITS AND FITS

Introduction – normal size, tolerance, limits, deviations, allowance, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly. Indian standard institution system – British standard system, International Standard system for plain and screwed work.

UNIT – II

LINEAR MEASUREMENT

Line, end and wave length standards, slip gauges – calibration of the slip gauges. Dial indicator, micrometers.

Measurement of Angles and Tapers: Different methods – Bevel protractor – angle slip gauges – spirit levels – sine bar – Sine plate, rollers and spheres used to determine the tapers.

Limit Gauges: Taylor's principle – Design of Go and No Go gauges, plug, ring, snap, gap, taper, profile and position gauges.

UNIT – III

OPTICAL MEASURING INSTRUMENTS

Tool maker's microscope and its uses – collimators, optical projector – optical flats and their uses, interferometer.

Surface Measurement: Measurement of flatness- instruments used - straight edges - surface plates - optical flat and auto collimator.

Surface Roughness Measurement: Differences between Surface Roughness and surface waviness - Numerical assessment of surface finish - CLA, R.M.S. values - Rz values,

L T P C 3 0 0 3

B. Tech-MECH

R18-Regulations

Methods of measurement of surface finish – profilograph. Talysurf, ISI symbols for indication of surface finish.

UNIT – IV

MEASUREMENT THROUGH COMPARATORS

Comparators – Mechanical, Electrical, Electronic and pneumatic comparators and their uses in mass production.

Screw Thread Measurement: Element of measurement – errors in screw threads – measurement of effective diameter, angle of thread and thread pitch, profile thread gauges.

$\mathbf{UNIT} - \mathbf{V}$

SURFACE ENGINEERING

Surface texture and properties, surface cleaning techniques, surface integrity, wear and its measurements, lubricants and its selection for reducing wear, principles of corrosion and remedial measures, Laser applications for surface modifications.

Surface Treatments: Mechanical surface treatment and coating, casehardening and surface coating, thermal spraying, vapour deposition, Ion implantation. Diffusion coating, Electro plating, Electro less plating and Electro forming, Ceramic, Organic and Diamond coating.

COURSE OUTCOMES:

At the end of the course student will get ability to

- 1. Apply mathematics to calculations of surface texture assessment by using C.L.A. and R.M.S. methods.
- 2. Analyse principles of optics, interference, light to optical flats, interferometers, microscopes and optical measuring instruments.
- 3. Compare tabulated physical data that are useful to assembly of components, clearance, transition, interference fits.
- 4. Illustrate linear, angular measurement by using various micrometers, bevel protractor, auto collimator etc.
- 5. Classify the basic techniques of surface engineering, surface treatment, surface coatings, and surface cleanings

TEXT BOOKS:

- 1. Metrology and Surface engineering by Mahajan & RK Jain / Khanna Publishers
- 2. Engineering Metrology/I C Gupta / Dhanpath Rai.

REFERENCE BOOKS:

- 1. Connie Dotson, "Fundamentals of Dimensional Metrology", Thomson, 2003 6th Edition, ISBN-13: 9781133600923.
- 2. JR Davis, "Surface Engineering for corrosion and wear resistance", Woodhead Publishers, ISBN-13: 978-08717070

R18-Regulations

LTPC

0

0 3

3

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME19) THERMAL ENGINEERING – II)

B.Tech: V-Semester

COURSE OBJECTIVES:

- 1. Demonstrate the understanding of working principle of steam power plant.
- 2. Understand the working principle of internal combustion engine and its components details, fuel injection carburetor, cooling and lubrication systems.
- 3. Differentiate the thermodynamic analysis of steam nozzles, turbines.
- 4. Know various stages of combustion in compression ignition engines, diesel knock.
- 5. Solve problems on problems on performance of boilers, steam turbines, turbines.
- 6. Understand constructional details and working principle of different types of compressors.

UNIT – I

BASIC CONCEPTS

Rankine Cycle – Schematic layout, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance – Regeneration & reheating; Combustion: fuels and combustion, concepts of heat of reaction, adiabatic flame temperature, Stoichiometry, and Flue gas analysis.

UNIT – II

BOILERS

Classification – Working principles – with sketches including H.P. Boilers – Mountings and Accessories – working principles, boiler horse power, equivalent evaporation, efficiency and heat balance; Draught - classification – Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – artificial draught, induced and forced.

UNIT – III

STEAM NOZZLES AND CONDENSORS

Function of nozzle – applications – types, Flow through nozzles, thermodynamic analysis – assumptions – velocity of nozzle at exit - Ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape; Super saturated flow, its effects, degree of super saturation and degree of under cooling – Wilson line.

Steam Condensers: Requirements of steam condensing plant – Classification of condensers – working principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects, air pump, cooling water requirement.

UNIT – IV

REACTION AND IMPULSE TURBINES

Steam Turbines: Classification, Analysis of various types of steam turbines, Delaval, Curtis, Ratean, Condensing and Non Condensing Turbines.

R18-Regulations

Reaction Turbines: Mechanical details – principle of operation, thermodynamic analysis of a stage, degree of reaction – velocity diagram – Parson's reaction turbine – condition for maximum efficiency.

Impulse Turbines: Mechanical details – Velocity diagram – effect of friction – power developed, axial thrust, and blade or diagram efficiency – condition for maximum efficiency. Methods to reduce rotor speed – velocity compounding and pressure compounding, velocity and pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine.

UNIT – V

GAS TURBINES

Simple gas turbine plant – Ideal cycle, essential components – parameters of performance – actual cycle – regeneration, inter cooling and reheating – closed and semi- closed cycles – merits and demerits, brief concepts about compressors, combustion chambers and turbines of Gas turbine plant.

Case Studies:

- 1. Case study on Thermal Failures like Boiler Failures.
- 2. Case study on "The Stanley Steamer Automobile"
- 3. Case study on "The Drinking Bird as a Heat Engine.

COURSE OUTCOMES:

The students will be able to

- 1. Understand the basic concept behind the thermal power plant.
- 2. Get knowledge about working of boilers with their specification.
- 3. Analyze the importance of nozzle and condenser in steam power plant.
- 4. Identify the different types of steam turbines and use accordingly to the requirement.
- 5. Get the concepts of gas power plant with its different components.

TEXT BOOKS:

- 1. R.K. Rajput, "Thermal Engineering", Laxmi Publications, 9th Ed. 2013, ISBN,: 978-93-81159-52-1.
- 2. Mahesh M Rathore, "Thermal Engineering", TMH, ISBN: 9780070681132.

REFERENCE BOOKS:

- 1. R.Yadav, "Thermodynamics and Heat Engines", Central Book Dept, ISBN: 9788185444031.
- 2. P.Khajuria and S.P.Dubey, "Gas Turbines and Propulsive Systems", Dhanpatrai, ISBN: 9788189928483.
- 3. M.L.Mthur & Mehta, "Thermal Engineering", Jain Bros., ISBN : 8186321861.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MC09) HUMAN VALUES AND PROFESSIONAL ETHICS

B.Tech: V-Semester

L T P C 2 0 0 0

Prerequisites: None

UNIT-1:

Human Values: Morals, values, ethics – integrity – work ethics –service learning – civic virtue – respect for others- living peacefully - Caring –sharing –honesty – courage – valuing time – cooperation – commitment –empathy – self-confidence –spirituality – character- Mini-Cases

UNIT-II:

Professional Ethics: Profession- and professionalism - Two models of professionalism - Professional etiquette -Three types of Ethics or morality Responsibility in Engineering - Engineering standards –Engineering Ethics – Positive and Negative Faces. Professional Codes and Code of conduct (as given by ASME, ASCE, IEEE, IETE, Institute of Engineers as Guidelines for ethical conduct). Mini-cases.

UNIT-III:

Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis– congeniality, collegiality and loyalty. Respect for authority – conflicts of interest – occupational crime — Mini-Cases.

UNIT-IV:

Professional Rights: professional rights and employee rights communicating risk and public policy – Whistle blowing - collective bargaining. Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Regulatory Compliances, Monitoring and control- Mini-Cases

UNIT-V:

Ethics in global context: Global issues in MNCs- Problems of bribery, extortion and grease payments – Problem of nepotism, excessive gifts – paternalism – different business practices – negotiating taxes. Mini-Cases.

MINI-PROJECTS

Project 1: The student of this course should invariably attend (or watch on internet/any TV channel/you tube/social media) two speeches of 30 minutes duration each dealing with spiritual discourse and submit a report on the contents of the lecture proceedings.

Project 2: Visit any organization (including shops/ hotels or shopping malls in your region) of your choice and observe how the professionals perform the given job with a focus on Professional ethics and human values.

REFERENCE BOOKS:

- 1. Aryasri, Human Values and Professional Ethics, Maruthi Publications.
- 2. S B George, Human Values and Professional Ethics, Vikas Publishing.
- 3. KR Govindan & Saenthil Kumar:Professional Ethics and Human Values, Anuradha Publications.
- 4. S K Chakraborthy & D.Chakraborthy: Human Values and Ethics, Himalaya.
- 5. M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: Engineering Ethics(Includes Human Values), HI Learning Pvt. Ltd., New Delhi 110001

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MB01) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (OPEN ELECTIVE-I)

B.Tech: V-Semester

L T P C 3 0 0 3

Prerequisites: None

COURSE OBJECTIVES:

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely. Demand and supply, production function, cost analysis, markets forms of business organizations, capital budgeting and financial accounting and financial analysis by using ratios.

UNIT – I

Introduction to Managerial Economics: Definition, Nature and Scope Managerial Economics Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT – II

Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, Fixed Vs. Variable costs, Explicit costs Vs.Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)-Managerial Significance and limitations of BEA.

UNIT – III

Introduction to Markets & Pricing strategies: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Strategies, Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT – IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance, Nature and scope of capital budgeting, features of capital budgeting proposals, methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

R18-Regulations

UNIT – V

Introduction to Financial Accounting & Financial Analysis: Double-Entry Book Keeping, Journal, Ledger, Trial Balance – Final Account (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.) Computation, Analysis and Interpretation of Liquidity Ratios (Current Ration and quick ratio), Activity Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS

Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCE BOOKS:

- 1) Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2004.
- 2) Shim & Siegel: Financial Accounting (Schaum's Outlines), 2/e TMH, 2004
- 3) Chary: Production and Operations Management, 3/e, TMH, 2004.
- 4) Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson, 2003.
- 5) Narayanaswamy: Financial Accounting-A Managerial Perspective, PHI, 2005.
- 6) Peterson & Lewis: Managerial Economics, 4th Edition, Pearson Education, 2004.
- 7) Raghunatha Reddy & Narasimhachary: Managerial Economics & Financial Analysis, Scitech, 2005.
- 8) S.N.Maheswari & S.K. Maheswarial, Financial Accounting, Vikas, 2005.
- 9) Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2004.
- 10) Dwivedi: Managerial Economics, 6th Ed., Vikas, 2002.
- 11) Yogesh Maheswari: Managerial Economics, 2nd Ed., PHI, 2005

COURSE OUTCOMES:

- 1) To study fundamental concepts in managerial economics and financial analysis including certain basic issues governing the business operations.
- 2) To learn the concepts of demand, elasticity of demand and demand forecasting and methods of demand forecasting.
- 3) To learn various issues involved in production decision analysis.
- 4) To gain the knowledge of Break Even Analysis and its importance in managerial decision making.
- 5) To learn different types of market environment under various types of competition.
- 6) To gain the knowledge of new economic environment in post liberalization scenario.
- 7) To know the concepts of capital budgeting and various methods of capital budgeting and its application in business decision making.

Learning Outcomes:

- 1) Have an ability to understand the market dynamics namely, demand, demand forecasting, elasticity of demand, pricing methods and pricing in different market structures.
- 2) Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
- 3) Have an ability to understand the application of BEA in business decision making.
- 4) Have an ability to understand how capital budging decisions are carried out in business organization.
- 5) Have an ability to record the business transactions and following accounting process.
- 6) Have an ability to analyse and interpret the financial statements through ratio analysis.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING AUTONOMOUS

(B18MB03) ENTREPRENEURSHIP DEVELOPMENT (OPEN ELECTIVE)

B.Tech: V-Semester

L T P C 3 0 0 3

Pre requisites: None

COURSE OBJECTIVE:

The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise. The objective of the course is to enlighten with the fragrance of Corporate Good Governance and Business Ethics, so that they would become the best entrepreneurs / managers of the corporate world.

UNIT – I

Nature of Entrepreneurship; Characteristics – Qualities and skills of an Entrepreneur – Functions of entrepreneur – Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business – Importance in Indian Economy – Types of ownership – Sole trading – Partnership – Joint stock company and other forms. First – Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness

UNIT – II

Aspects of Promotion: Generation of new entry opportunity, SWOT Analysis, Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights- Project Planning and Feasibility Studies- Major steps in product development. Financial Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies, Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI,NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments.

UNIT – III

Introduction to Business Ethics: Necessity for Business Ethics-Need for Ethical guideline – Salient Issues in Ethics and Commerce- Ethics as a Luxury – Earlier attempts at Ethics in Industry – Justification for Ethics – Effect of Migration of National Character – Shadow Economy – Basic Principles in Ethics – Corporate Climate and corporate climate audits – Political Issues – Nature and theory of Ethics – The Naturalistic fallacy - G.E.Moore's Philosophy.

R18-Regulations

UNIT – IV

Understanding Corporate Governance: Corporate Governance- Capitalism at crossroads – Historical perspective of Corporate Governance – Issues of Corporate Governance – Theoretical basis of Corporate Governance – Corporate Governance mechanisms – Indian Model of Governance – Good Corporate Governance – Corporate Governance committees – OECD Principles – Indian Committee and guidelines – The confederation of Indian Industry's initiative. Corporate Governance Models, Corporate Social Responsibility.

UNIT - V

Corporate Social Responsibility: System Concept of Business Society – Social Responsibility – Social Responsibility tools – approaches to Ethics – Corporate Social Accountability - Business in a Social World – Ethics and Social Responsibility – professional ethics – Ethics of practicing company secretaries- Ethical investing.

TEXT BOOKS:

Robert D Hisrich, Michael P Peters, Dean A Shepherd: Entrepreneurship, TMH, 2009 Vasanth Desai: Entrepreneurship, HPH, 2009 C.S.V.Murthy: Business Ethics & Corporate Governance, Himalaya, 2009.

REFERENCES:

Bholanath Dutta: Entrepreneurship Text and Cases, Excel, 2009
David Martin: Corporate Governance, Viva, 2009
H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
Barringer: Entrepreneurship, Pearson,2009.
Ronald D Francis & Mukti Mishra: Business Ethics, TMH, 2009
RK Mishra,Gitarani: Corporate Governance, Excel,2009
A.C.Frenando: Corporate Governance, Pearson, 2006
V.Balachandran & V.Chandrasekaran: Corporate Governance & Social Responsibility, PHI, 2009
A.C.Fernando: Business Ethics, Pearson, 2009
Laura P Hartman & Abha Chatterjee: Business Ethics, TMH, 2009
Tripat Kaur: Values and Ethics in Management, 2/e, Paragon International, 2009.

Learning Outcome: By the end of this course the students should be able to understand the mindset of the entrepreneurs, identity ventures for launching, develop an idea on the legal framework and also understand strategic perspectives in entrepreneurship.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18EE49) ENERGY STORAGE SYSTEMS (OPEN ELECTIVE)

B.Tech: V-Semester

L T P C 3 0 0 3

COURSE OBJECTIVES:

- Introduce to the technology of energy storage systems
- Learn about the characteristics of electricity and need of ESS in various applications
- Learn about the various types and features of ESS
- Learn about the practical applications of ESS

UNIT-I: ELECTRICAL ENERGY STORAGE TECHNOLOGIES

Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

UNIT-II: NEEDS FOR ELECTRICAL ENERGY STORAGE

Emerging needs for EES, More renewable energy, less fossil fuel, Smart Grid uses, The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

UNIT-III: FEATURES OF ENERGY STORAGE SYSTEMS

Classification of EES systems, Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES),Electrochemical storage systems, Secondary batteries, Flow batteries, Chemical energy storage, Hydrogen (H2),Synthetic natural gas (SNG).

UNIT-IV: TYPES OF ELECTRICAL ENERGY STORAGE SYSTEMS

Electrical storage systems, Double-layer capacitors (DLC) ,Superconducting magnetic energy storage (SMES),Thermal storage systems ,Standards for EES, Technical comparison of EES technologies.

UNIT-V: APPLICATIONS

Present status of applications, Utility use (conventional power generation, grid operation & service), Consumer use (uninterruptable power supply for large consumers), New trends in applications, Renewable energy generation, Smart Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems , Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA– aggregation of many dispersed batteries.

Course Outcomes:

- Apply the technology to have energy storage system for any electrical Loads
- To save the electrical power in peak time loads using ESS
- To store energy and to avoid the environmental pollution

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

((B18ME20) THERMAL ENGINEERING LABORATORY

B.Tech: V-Semester

COURSE OBJECTIVES:

- 1. Demonstrate the working principle of an IC engine.
- 2. Conduct test on the engines to its performance parameters like Brake thermal efficiency. Brake specific fuel consumption, and Mechanical efficiency.
- 3. Estimate useful amount of heat energy and also various heat losses in the engine.
- 4. Conduct tests on different engines like Petrol, Diesel, 4-stroke, Single cylinder and Multi cylinder engines.
- 5. Know various loads to be applied on the engine like electric, mechanical and hydraulic loading.
- 6. Know the performance of a compressor unit.

LIST OF EXPERIMENTS:

- 1. Single cylinder 4-stroke Diesel engine test Rig (Mechanical Loading).
- 2. 4-Stroke multi cylinder Petrol Engine test Rig.
- 3. Valve and Port timing Diagram Experiment.
- 4. 2-stage reciprocating Air Compressor
- 5. Study of Boiler models.
- 6. Assemble and Dissemble of Engine
- 7. Single cylinder 4-stroke Diesel engine test Rig (Electrical Loading)
- 8. Single cylinder 2-stroke Petrol engine test Rig
- 9. Variable compression ratio petrol engine Test Rig (DC dynamo meter loading)
- 10. Heat balance on SI and CI engines

COURSE OUTCOMES:

The students will be able to

- 1. Identify various types of engines and their parts.
- 2. Understand the power of different engine and where they can be used.
- 3. Estimate the performance of different engine and analyze them.
- 4. Analyze engines to set better efficiencies by knowing Brake specific fuel consumption of the engines.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

((B18ME21) METROLOGY AND MACHINE TOOLS LABORATORY

B.Tech: V-Semester

COURSE OBJECTIVES:

- 1. Apply the principles of metrology with the measuring instruments, Vernier calipers, micrometer, bevel protractor, tally surf, tool maker's microscope, sinebar etc.
- 2. Employ their knowledge to lathe, milling alignment tests with dial Gauges, spirit levels.
- 3. Study about various instruments used in industries

METROLOGY LAB

- 1. Measurement of lengths, heights, diameters by Vernier calipers.
- 2. Thread Measurement by 2- wire and 3- wire method.
- 3. Use of gear teeth Vernier calipers and checking the chordal addendum and chordal height of spur gear.
- 4. Machine tool "alignment test on the lathe".
- 5. Tool makers' microscope and its application.
- 6. Angle and taper measurements by Bevel protractor, Sine bars, etc.
- 7. Measurement of different heights by using Vernier height gauge.

COURSE OUTCOMES:

Students will be able to

- 1. Use different types of measuring instruments
- 2. Perform different operations on Lathe machines.
- 3. Measure angles and taper measurements.
- 4. Evaluate different heights by using Vernier height gauge.

COURSE OBJECTIVES:

- 1. Apply practical knowledge of machining to operate machine tools.
- 2. Operate lathe, milling machine, drilling, grinding, shaper, slotting machines.
- 3. Select cutting tool materials and tool geometries for different metals.
- 4. Perform turning, taper turning, thread cutting and knurling operations on lathe.
- 5. Apply the principles of metrology with the measuring instruments, Vernier calipers, micrometer, bevel protractor, tally surf, tool maker's microscope, sinebar etc.
- 6. Employ their knowledge to lathe, milling alignment tests with dial Ganges, and spirit levels.

MACHINE TOOLS

- 1. Introduction of general purpose machines Lathe, Drilling machine, Milling machine, Shaper.
- 2. Introduction of Planning machine, slotting machine, surface grinder and tool and cutter grinder.
- 3. Step turning and taper turning on lathe machine.
- 4. Thread cutting and knurling on lathe machine.
- 5. Drilling and tapping.
- 6. Shaping and planning.
- 7. Slotting.
- 8. Milling.

Department of Mech

L T P C 0 0 3 1.5

9. Cylindrical Surface Grinding.

10. Grinding of Tool angles.

COURSE OUTCOMES:

The students will be able to

- 1. This course provides fundamental knowledge and principles of machining to the operation of different marching processes on machine tools.
- 2. The course draws upon knowledge of metal cutting principles turnouts the lathes, milling, drilling, shaping, slotting, and grinding machines.
- 3. The course shows how to evaluate machined work piece surface finish and dimensional accuracy using metrology equipment.
- 4. Students will be able to differentiate the lubrication and cooling effects of various cutting fluids.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME22) FINITE ELEMENT METHODS

B.Tech: VI- Semester

L T P C 3 0 0 3

COURSE OBJECTIVES:

- 1. To analyze various engineering objects by deserting them in to small elements.
- 2. To analyze complicated objects and to find stresses, strains, deflection slopes under various load.
- 3. To understand potential energy, approach and boundary conditions.
- 4. To find out stiffness matrix of components to know various parameters objects.
- 5. To analyze two dimensional elements by using constant strain triangles methods.
- 6. To analyze one dimensional heat transfer problems like fins and thin plates and to solve Eigen values of stepped bar and beams.

UNIT – I

INTRODUCTION TO FEM

Basic concepts, historical back ground, application of FEM, general description, comparison of FEM with other methods. Basic equation of elasticity. Stress – Strain and strain – displacement relations for 2-D and 3-D. Rayleigh – Ritz method, weighted residual methods.

One Dimensional Problems: Finite element modeling co-ordinates and shape functions. Finite element equations for an axial bar element in local coordinates using Potential energy approach— Finite element analysis of uniform, stepped and tapered bars subjected to mechanical loads – Assembly of Global stiffness matrix and load vector – Quadratic shape functions.

UNIT – II

Analysis of Trusses: Stiffness matrix for plane truss elements, Stress calculations and problems.

Analysis of Beams: Hermite shape functions – Element stiffness matrix – Load vector – simple Problems.

UNIT – III

2-D PROBLEMS

Finite Element modeling of two dimensional stress analysis with Constant Strain Triangles (CST) and treatment of boundary conditions. Estimation of Load vector, stresses.

Finite element modeling of axi symmetric solids subjected to Axi symmetric loading with triangular elements.

Two dimensional 4 noded isoparametric elements and problems.

UNIT – IV

SCALAR FIELD PROBLEMS

Study state Heat transfer analysis: One dimensional analysis of Slab, fin and two dimensional analysis of thin plate- problems.

UNIT – V

DYNAMIC ANALYSIS

Dynamic equations – Lumped and consistent mass matrices – Evaluation of Eigen values and Eigen vectors – mode shapes for a stepped bar and beams.

R18-Regulations

COURSE OUTCOMES:

The students will be able to

- 1. Student is able to analyze real time engineering objects and to present a well designed structures.
- 2. Student can analyze bars beams, shafts and array symmetric solids.
- 3. Student is able to understand and analyze the heat flow and know the temperature distribution at various points on the components.
- 4. Student can analyze any complicated structure by utilizing the computer software like ANSYS instead of analytical methods.
- 5. Estimate Load vector and stresses in 2D problems.

TEXT BOOKS:

- 1. Tirupathi K.Chandrapatla and Ashok D.Belagundu, "Introduction to finite elements in engineering", Mc.Graw Hill, 4th Ed., Oct. 2011, 4th Ed., ISBN-13: 978-0132162746.
- 2. S.S.Rao, "The finite element methods in Engineering", Elsevier, 5th edition, 2012, ISBN-13: 978-1856176613.

REFERENCE BOOKS:

- 1. J.N.Reddy, "An Introduction to Finite Element Methods", Mc.Grawhill, 2005, 3rd Ed. ISBN-13: 978-0072466850.
- O.C. Zienkowitz, "The Finite Element Method in engineering science", McGrawhill, 2nd Ed., ISBN-13: 978-0070941380.
- 3. S.Md.Jalaludeen, "Introduction of Finite Element Analysis", Anuradha publications, ISBN-13: 9788184720983.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME23) DESIGN OF MACHINE MEMBERS – II

B.Tech: VI-Semester

COURSE OBJECTIVES:

- 1. Select the material and its properties for the optimum design of a journal bearing.
- 2. Understand the design of IC engine parts.
- 3. Design the belt drives and the pulleys for power transmission.
- 4. Design the various types of gears for power transmission.
- 5. Design the various power drives suitable to transfer power requirements.

DESIGN OF MACHINE MEMBERS-II

UNIT-I

Bearings: Types of Journal bearings-basic modes of Lubrication – Bearing Modulus – full and partial bearings – Clearance ratio – Heat dissipation of bearings, bearing materials – journal bearing design. Ball and roller bearings - Static load - dynamic load - equivalent radial load – design and selection of ball & roller bearings.

UNIT – II

DESIGN OF IC ENGINE PARTS:

Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends - Cranks and Crank shafts. Pistons, Forces acting on piston - Construction, Design and proportions of piston.

UNIT-III

POWER TRANSMISSION SYSTEMS AND PULLEYS:

Transmission of power by Belt and Rope drives, Transmission efficiencies, types of Belts, Ratio of tensions, initial tension and centrifugal tension – Ropes – pulleys for belt and rope drives-materials-chain drivers

UNIT-IV

Gears: Spur gears – load concentration factor – Dynamic load factor – analysis of spur gears - check for plastic deformation-check for dynamic and wear consideration.

Helical and bevel gear drivers: Helical and bevel gears - load concentration factor-Dynamic load factor-analysis of helical and bevel gears- check for plastic deformation-check for dynamic and wear consideration.

Design of worm gears: Properties of worm gears - selection of materials - strength and wear rating of worm gears- force analysis-friction in worm gears.

UNIT- V

Design of Power Screws: Design of Screw – design of nut – compound screw – differential screw - ball screw - possible failures and remedies.

COURSE OUTCOMES:

The students will be able to

- 1. Design journal and roller bearings,
- 2. Design engine parts like connecting rod, crank pins, crank shafts, pistons, cylinder and cylinder liner.
- 3. Understand Power transmission system by belt drives and chain drives.

Department of Mech

4 0 0 4

LTPC

R18-Regulations

- 4. Understand the design of different gear.
- 5. Understand the design of different power screws.

TEXT BOOKS:

- P.Kannaiah, "Machine Design" Sci-Tech, 4th Ed. 2012, ISBN-13: 978-81-8371-151-7.
- 2. Pandya and Shah, "Machine Design", Charotar, 18th Ed. 2012, ISBN, : 978-93-80358-51-2.
- 3. Design data book, PSG Data Book.

NOTE:- Design Data Book To be Provided by the time of Examination.

REFERENCE BOOKS:

- 1. Schaum Series, "Machine deign", Mc.Graw Hill, 1st Edition, ISBN-13: 9780070255951.
- 2. R.S.Kurmi, J.K.Gupta, "Machine design", S. Chand, 14th Ed, ISBN Number-13: 9788121925372.
- 3. S.Md.Jalaludeen, "Machine Design", Anuradha Publications, 14th Ed., ISBN-13: 97881896382

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME24) HEAT& MASS TRANSFER

B.Tech: VI-Semester

L T P C 3 0 0 3

COURSE OBJECTIVES:

- 1. To understand the basic differences between the modes of heat transfers conduction, connection and radiation.
- 2. To know the basic laws like Fourier's law, Newton's law of cooling and Stefan Boltzmann law: Chart solutions of transient condition system.
- 3. To understand the concept of hydrodynamic and thermal boundary layers. Heat transfer in phase change like boiling and condensation. Film wise and drop wise condensation.
- 4. To know various types of heat exchangers and heat transfer coefficients.
- 5. To know the concepts of log mean temperature difference and NTU methods for heat exchangers.
- 6. To understand Radiation heat transfer, Planks law, Kirchhoff law, Stefan Boltzmann law, concept of shape factor, black body and emissivity.

UNIT – I

INTRODUCTION

Modes and mechanisms of heat transfer – Basic laws of heat transfer – General discussion about applications of heat transfer. Conduction Heat Transfer: Fourier rate equation – General heat conduction equation in Cartesian, cylindrical and Spherical coordinates.Simplification and forms of the field equation – steady, unsteady and periodic heat transfer – Initial and boundary conditions.

UNIT – II

CONDUCTION HEAT TRANSFER

One Dimensional Steady State Conduction Heat Transfer: Homogeneous slabs, hollow cylinders and spheres – overall heat transfer coefficient – electrical analogy – Critical radius of insulation. Variable and Thermal conductivity systems with heat sources or Heat generation.

Extended surface (fins) Heat Transfer – Long Fin, Fin with insulated tip and Short Fin, Application to error measurement of Temperature.

One Dimensional Transient Conduction Heat Transfer: Systems with negligible internal resistance – significance of Biot and Fourier Numbers – Chart solution of transient conduction systems. Concept of Functional Body.

UNIT – III

CONVECTIVE HEAT TRANSFER

Classification of systems based on causation of flow, condition of flow, configuration of flow and medium of flow – Dimensional analysis as a tool for experimental investigation – Buckingham Pi Theorem and method, application for developing semi – empirical non-dimensional correlation for convection heat transfer – Significance of non-dimensional numbers – Concepts of Continuity, Momentum and Energy Equations.

Free Convection: Development of Hydrodynamic and Thermal boundary layer along a vertical plate – Use of empirical relations for Vertical plates and Pipes.

R18-Regulations

UNIT – IV

FORCED CONVECTION - INTERNAL FLOWS

Concepts about Hydrodynamic and Thermal Entry Lengths – Division of internal flow based on this – Use of empirical relations of Horizontal Pipe Flow and annulus flow.

Forced convection: External Flows: Concepts about hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer – Flat plates and Cylinders.

Heat Transfer with Phase Change: Boiling: Pool boiling – Regimes Calculations on Nucleate boiling, Critical Heat Flux and Film boiling Condensation: Film wise and drop wise condensation – Nusselt's Theory of Condensation on a vertical plate – Film condensation on vertical and horizontal cylinders using empirical correlations

UNIT – V

HEAT EXCHANGERS: Classification of heat exchangers – overall heat transfer Coefficient and fouling factor – Concepts of LMTD and NTU methods. Problems using LMTD and NTU methods.

Radiation Heat Transfer: Emission characteristics and laws of black, body radiation – Irradiation – total and monochromatic quantities – laws of Planck, Wien, Kirchhoff, Lambert, Stefan and Boltzmann – heat exchange between two black bodies – concepts of shape factor – Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiation network.

COURSE OUTCOMES:

The students will be able to

- 1. Understand the basics of heat transfer with good knowledge of conduction, construction and radiation.
- 2. Identify the free convection and forced convection requirement for particular design.
- 3. Analyse the concept of heat convection and get better result from free convection.
- 4. To know the concept of hydrodynamics and thermal boundary in forced convection.
- 5. Design effective heat exchanger by considering concepts of radiation heat transfer along with conduction and convection.

TEXT BOOKS:

- 1. R.C. SACHDEVA, "Fundamentals of Engineering Heat and Mass Transfer", New Age Publishers, 4th Ed. 2010, ISBN : 978-81-224-2785-1.
- 2. R.K. Rajput, "Heat and Mass Transfer", S. Chand & Company Ltd., 5th Edition, ISBN Number: 978-8121926171.

REFERENCE BOOKS:

- 1. Yunus A.Cengel, "Heat Transfer: A Practical Approach", Tata McGraw Hill (P) Ltd., 4th Ed., ISBN 13: 9780073398129.
- 2. F.P Incropera, "Fundamentals of Heat and Mass Transfer", John Wiley & Sons 6th Ed., ISBN-13: 978-0471457282.
- 3. HOLMAN, "Heat Transfer", TMH 10TH Ed., ISBN Number: 9780071069670.

B. Tech-MECH **R18-Regulations** VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MC02) ENVIRONMENTAL SCIENCE

B.Tech: VI-Semester

OBJECTIVES:

• Understanding the importance of ecological balance for sustainable development.

- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

UNIT-I

Ecosystems:

Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources:

Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources:

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies:

Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition

Department of Mech

LT P C 3 0 0 3

R18-Regulations

and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA:

Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

Course Outcomes: After the completion of this course, the student should be able to

- Recall previously learned ecosystem and find how the biodiversity changes went in the environment.
- > Demonstrate outlines of types of pollutions and related to day-to-day life.
- > Organize important seminars on natural resources.
- > Apply models of food chains and energy flow models to solve the identified parameters.
- Classify the types of pollutants and distinguish the functions of sustainable development that take part in the environment.
- Design the experiments with BOD, COD, OD and to estimate the micro organisms which cause contamination and can propose solutions.

TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.

2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.

Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
 Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MB05) INDUSTRIAL MANAGEMENT (ELECTIVE-I)

B.Tech: VI-Semester

L T P C 3 0 0 3

COURSE OBJECTIVES:

This course is intended to familiarize the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

UNIT - I:

Introduction to Management and Organization: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory- Fayal's Principles of Management-Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management, Designing Organisational Structures: Basic concepts related to Organisation

- Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

UNIT - II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering(BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management(HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Seperation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating

- Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

R18-Regulations

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

Text Books:

- 1. Aryasri: Management Sciences, 2/e, TMH, 2005.
- 2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
- 3. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

Reference Books:

- 1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
- 2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
- 3. Thomas N. Duening and John M. Ivancevich Management Principles and Guidelines, Biztantra, 2012.
- 4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
- 5. Samuel C. Certo: Modern Management, 2012.
- 6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
- 7. Parnell: Strategic Management, Cengage, 2012.
- 8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

COURSE OUTCOMES:

By the end of the course, the student will be in a position to

- Plan an organizational structure for a given context in the organisation carry out production operations through Work study.
- Carry out production operations through Work study.
- Understand the markets, customers and competition better and price the given products appropriately.
- Ensure quality for a given product or service.
- Plan and control the HR function better.
- Plan, schedule and control projects through PERT and CPM.
- Evolve a strategy for a business or service organisation.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CS08) DATABASE MANAGEMENT SYSTEMS (OPEN ELECTIVE)

B.Tech: VI-Semester

L T P C 4 0 0 4

COURSE OBJECTIVES:

This Course provides an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a Database and it presents an introduction to database management systems (DBMS) and relational data model. Also the course introduces the concepts of transactions and transaction processing and the issues and techniques relating to concurrency and recovery in multi-user database environments

UNIT- I

Introduction - Database system Applications - Database System versus File Systems -View of Data– Instances and schema - Data Models - Database Languages -DDL-DML -Database Users and Administrator –Transaction Management - Database System Structure-Application Architectures – History of Database Systems

UNIT-II

Database Design and ER model – Basic concepts - Entity sets and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Designing of an E-R Database Schema-Reduction of an E-R Schema to Tables.

UNIT – III

Introduction to the Relational Model – Structure of Relational Databases - Relational Algebra

-Relational Calculus – Domain relational Calculus , Touple Relational Calculus -Integrity and Security –Domain Constraints ,Referential Integrity Constraints-Triggerssecurity and Authorization – SQL- Basic Structure, Set operations ,Aggregate Operations – Null values- Nested Sub queries – Views –Modification of Database- Joined relations ,Data Definition Language, Embedded SQL ,Dynamic SQL.

UNIT - IV

First Normal Form ,Pitfalls in Relational Database Design-Functional Dependencies– Decomposition – Desirable properties of Decomposition – Boyce-Codd Normal Form — Third Normal Form- Fourth Normal Form. Transactions-Transaction Concept- Transaction state- Implementation of atomicity and Durability- Concurrent Executions – Serializability, Recoverability-Implementation of Isolation

UNIT-V

Concurrency Control-Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols, Multiple Granularity, Dead Lock Handling-Recovery System – Failur

Classification, Storage Structure, Recovery and Atomicity,Log Based recovery ,Shadow Paging, Recovery with concurrent transactions. Storage and File Structure - File Organization – Organization of records in file - Data

R18-Regulations

Dictionary Storage – Indexing and Hashing – Basic Concepts, Ordered Indices,B+Tree Index files, B- tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing and Hashing.

TEXT BOOKS.

1. Database System Concepts, Silberschatz, Korth, Fourth Edition, McGraw hill (Chapters 1,2 excluding 2.10,3,4 excluding 4.8,4.14,6 excluding 6.6, 6.7,7 excluding 7.9, 7.10,11 excluding 11.1 to 11.5,12 excluding 12.8, 12.9, 15 excluding 15.8, 15.9, 16 excluding 16.5, 16.7, 17 excluding 17.7 to 17.10).

REFERENCES:

- 1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
- 2. Database Management Systems, Raghuramakrishnan, Johannes Gehrke, TATA Mc Graw Hill
- 3. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

Course Outcomes:

- A strong foundation in core Computer Science and Engineering, both theoretical and
- applied concepts.
- An ability to apply knowledge of mathematics, science, and engineering to realworld problems.
- Ability to model, understand, and develop complex software for system software as well as application software.
- An ability to communicate effectively, both in writing and oral.
- The broad education necessary to understand the impact of computer science and engineering solutions in the scientific, societal and human contexts
- A recognition of the need for, and an ability to engage in life-long learning
- A knowledge of contemporary issues.

Learning Outcomes

- 1. Ability to understand the fundamental concepts of database management.
- 2. Ability to design and query databases, as well as understand the internals of databases.
- 3. Ability to define basic functions of DBMS & RDBMS.
- 4. Ability to describe database development process and to apply the Relational Database Model to understand the Logical and Physical aspects of the DBMS architecture.
- 5. Ability to analyze database models & entity relationship models and to draw the E-R diagram for the given case study.
- 6. Ability to use Structured Query Language (SQL) with complex queries.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CE54) DISASTER MANAGEMENT (OPEN ELECTIVE)

B.Tech: VI-Semester

COURSE OBJECTIVES:

Student will be able to

- Understand the difference between a hazard and disaster
- Know about various disasters and their impacts
- Understand different approaches of disaster risk reduction
- Understand disaster risks in India

UNIT - 1

Understanding Disaster

- 1. Concept of Disaster
- 2. Different approaches
- 3. Concept of Risk
- 4. Levels of Disasters
- 5. Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerability

- 1. Natural and man-made hazards; response time, frequency and forewarning levels of different hazards.
- 2. Characteristics and damage potential or natural hazards; hazard assessment.
- 3. Dimensions of vulnerability factors; vulnerability assessment.
- 4. Vulnerability and disaster risk.
- 5. Vulnerabilities to flood and earthquake hazards.

UNIT 2 : Disaster Management Mechanism

- 1. Concepts of risk management and crisis managements.
- 2. Disaster Management Cycle.
- 3. Response and Recovery.
- 4. Development, Prevention, Mitigation and Preparedness.
- 5. Planning for Relief.

UNIT 3: Capacity Building

- 1. Capacity Building: Concept.
- 2. Structural and Nonstructural Measures.
- 3. Capacity Assessment; Strengthening Capacity for Reducing Risk.
- 4. Counter-Disaster Resources and their utility in Disaster Management.
- 5. Legislative Support at the state and national levels.

UNIT 4: Coping with Disaster

- 1. Coping Strategies; alternative adjustment processes.
- 2. Changing Concepts of disaster management.
- 3. Industrial Safety Plan; Safety norms and survival kits.
- 4. Mass media and disaster management.
- 5.

L T P C 4 0 0 4

R18-Regulations

- UNIT 5: Planning for disaster management
 - 1. Strategies for disaster management planning.
 - 2. Steps for formulating a disaster risk reduction plan.
 - 3. Disaster management Act and Policy in India.
 - 4. Organizational structure for disaster management in India.
 - 5. Preparation of state and district disaster management plans.

Text Books

- 1. Alexander, D. Natural Disasters, ULC press Ltd, London, 1993.
- 2. Carter, W.N. Disaster Management: A Disaster Management Handbook, Asian Development Bank, Bangkok, 1991.
- 3. Manual on Natural Disaster Management in India, NCDM, New Delhi, 2001.

References

- 1. Abarquez I. & Murshed Z. Community Based Disaster Risk Management: Field Practitioner's Handbook, ADPC, Bangkok, 2004.
- 2. Goudie, A. Geomorphological Techniques, Unwin Hyman, London 1990.
- 3. Goswami, S.C Remote Sensing Application in North East India, Purbanchal Prakesh, Guwahati, 1997.
- 4. Chakrabarty, U.K. Industrial Disaster Management and Emergency Response, Asian Book Pvt. Ltd., New Delhi 2007.
- 5. Disaster Management in India, Ministry of Home Affairs, Government of India, New Delhi, 2011.
- 6. National Policy on Disaster Management, NDMA, New Delhi, 2009
- 7. Disaster Management Act. (2005), Ministry of Home Affairs, Government of India, New Delhi, 2005.
- 8. District Disaster Management Plan-Model Template, NIDM, New Delhi, 2005.
- 9. Disaster Management, Future challenge and opportunities, Edited by Jagbir singh, I.K. International publishing home Pvt, Ltd.

Course Outcomes:

After completion of this course, student should be able to

- Acquire the knowledge of disaster Management
- Understand the vulnerability of ecosystem and infrastructure due to a disaster
- Acquire the knowledge of Disaster Management Phases
- Understand the hazard and vulnerability profile of India

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

((B18ME25) NANO TECHNOLOGY

B.Tech: VI-Semester

L T P C 3 0 0 3

(PROFESSIONAL ELECTIVE-I)

Course Objectives:

- 1. Understand the fundamentals of Nano theory, necessary background for applications in various industries.
- 2. Learn the components of Nano materials in detail, and its working in different applications
- 3. Understand the general scientific concepts required for technology, Apply the concepts in solving engineering problems,
- 4. Explain scientifically the new developments in engineering and technology, and Get familiarized with the concepts, theories, and technological applications

UNIT-1:

Introduction to Nanotechnology: Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nanomaterials, top-down and bottom – up approach to nanostructures.

Quantum Mechanical phenomenon in Nanostructures: Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum Wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

UNIT-II:

Carbon Nano Structures: Carbon Nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, properties (mechanical, optical and electrical) and applications.

UNIT-III:

Fabrication of Nanomaterials: Physical Methods: Inert gas condensation, Arc discharge, RF plasma, plasma arc technique, lon sputtering, Laser ablation, Laser pyrolysis, Molecular beam eqitaxy, Chemical vapour deposition method.

Nano Scale characterization techniques: Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD.

UNIT-IV:

Nanodevices and Nanomedicine: Lab on chip for bioanalysis, Core/shell Nanoparticles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

Nano and molecular electronics: Resonant-Tunneling Structures, single electron tunneling, Single Electron transistors, coulomb blockade, glant magneto resistance, tunneling magneto resistance.

UNIT-V:

Nanolithography and Nanomanipulation: e-beam lithography and SEM based Nanolithography and Nanomanipulation, Ion beam lithography, oxidation and metallization Mask and its application. Deep UV lithography, x-ray based lithography.

R18-Regulations

COURSE OUTCOMES:

The students will be able to

- 1. Understand the fundamentals of Nanotechnology
- 2. Know the different classes of nano materials
- 3. Impart basic knowledge on various synthesis and characterization techniques involved in Nanotechnology
- 4. Make the learner familiarize with nanotechnology potentialities.
- 5. Apply transfer interdisciplinary systems engineering approaches to the field of nanotechnology.

TEXT BOOKS:

- 1. Charies.P.pode, introduction to nanotechnology, springer publications.
- 2. Springer Handbook of Nanotechnology-Bharat Bhusan.
- 3. Phani Kumar, principles of nanotechnology, scitech publications.

REFERENCES BOOKS:

- 1. David Ferry "Transport in Nano structures" Cambridge University press 2000.
- 2. Nanobiotechnology; ed, C.M.Niemeyer, C.A. Mirkin.
- 3. Nanofabrication towards biomedical application: Techniques, tools, Application and impact-Ed. Challa S., S.R.Kumar, J.H.Carola.
- 4. Encyclopedia of Nanotechnology-Hari Singh Nalwa
- 5. Carbon Nanotubes: Properties and Applications- Michael J.O'Connell.
- 6. S.Dutta "Electron Transport in Mesoscopic systems" Cambridge University press.
- 7. H.Grabert and M.Devoret "Single charge Tunneling" Plenum press 1992.

(B18ME26)MECHATRONICS

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(PROFESSIONAL ELECTIVE-I)

B.Tech: VI-Semester

COURSE OBJECTS:-

Students will be able to

- i) Know the basic concepts of mechatronics.
- ii) Know the various actuating systems like Hydraulic, pneumatic, mechanical and electrical actuating system.
- iii) Know about the micro processor and micro controllers.
- iv) Know about the system and interfacing and data acquisition.

UNIT-I

Mechatronics systems, elements, levels of mechatronics system, Mechatronics design system, measurement systems, control systems, microprocessor-based controllers, advantages and

displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT-II

Solid state electronic devices, PN Junction diode, BJT, FET, DIA and TRIAC. Analog signal conditioning, amplifiers, filtering. Introduction to MEMS & typical applications.

UNIT-III

Hydraulic and pneumatic actuating systems, Fluid systems, Hydraulic and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems: Mechanical actuating systems and electrical actuating systems.

UNIT-IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT-V

System and interfacing and data acquisition, DAQS, SCADA, A to D and D to A conversions; Dynamic models and analogies, System response . Design of mechatronics systems & future trends.

COURSE OUTCOMES:-

Student can be able to do

- 1. Use the control system; mechatronics design systems and measurement systems.
 - 2. Work on various actuating systems.
- 3. Convert the signals from one form to another form.
- 4. Estimate the micro controllers and micro processors.
- 5. Develop the simple programming code for PLC's.

R18-Regulations

L T P C 3 0 0 3

B.Tech-MECH

TEXT BOOKS:

- 1. Mechatronics Integrated Mechanical Electronics Systems/KP Ramachandran &GK Vijaya Raghavan/WILEY india Edition/2008
- 2. Mechatronics Electronics control systems in Mechanical and Electrical Engineering/W Bolton/Pearson Education press/3rd edition,2005.

REFERENCES:

- 1. Mechatronics Source books by Newton C Braga, Thomson Publications, Chennai.
- 2. Mechatronics N.Shanmugam/ Anuradha Agencies Publishers.
- 3. Mechatronics System Design/Devdas shetty/Richard/Thomson.

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME27) AUTOMOBILE ENGINEERING (PROFESSIONAL ELECTIVE-I)

B.Tech: VI-Semester

COURSE OBJECTIVES:

- 1. Understand the fundamentals of automobile theory, necessary background for intelligent diagnosis, maintenance and repair of different type of modern automobiles.
- 2. Learn the components of automobile in detail, power transmission, engine construction and working, lubrication system.
- 3. Get the idea of emissions that will be released from the automobile
- 4. Understand different types of fuel systems, cooling and ignition systems.
- 5. Understand different steering gear mechanisms
- 6. Gain knowledge of different systems of an automobile like electrical, transmission, suspension and breaking systems.

UNIT – I

INTRODUCTION

Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarburization, Nitriding of crank shaft..

Emission from Automobiles : Pollution standards, National and international – Pollution Control – Techniques – Noise Pollution & control.

Multi point fuel injection for SI engines, CRDI – solar photo – voltaic, hydrogen, bio mass, alcohals, LPG, CNG, Liquid fuels and gaseous fuels, merits and demerits.

UNIT – II

FUEL SYSTEM: S.I. Engine: Fuel supply systems, Mechanical and electrical fuel pumps – carburetor – types – air filters – petrol injection.

C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, Alternative fuels for Automobiles-injection, Classification, Properties, Hybrid vehicles, injection timing, testing of fuel pumps.

UNIT – III

COOLING SYSTEM: Cooling Requirements, Air Cooling, Liquid Cooling and Forced Circulation cooling System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporative cooling – pressure sealed cooling – antifreeze solutions.

Ignition System: Function of an ignition system, battery ignition system, constructional features of storage battery, auto transformer, contact breaker points, condenser and spark plug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

LTPC

0 0 3

3
R18-Regulations

B.Tech-MECH UNIT – IV ELECTRICAL SYSTEM:

Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism, solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

Transmission System: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – Gear boxes, types, sliding mesh, constant mesh, synchro mesh gear boxes, epicyclic gear box, over drive torque converter. Propeller shaft – Hatch – Kiss drive, Torque tube drive universal joint, differential rear axles – types – wheels and tyres.

UNIT – V

STEERING SYSTEM: Steering geometry – camber, castor, king pin rake, combined angle toe in, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

Suspension System: Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

Braking System: Mechanical brake system, Hydraulic brake system, Master cylinder, wheel cylinder, tandem master cylinder, Requirement of brake fluid, Pneumatic and vacuum brakes.

COURSE OUTCOMES:

The students will be able to

- 1. Understand the various part used in automotive pollution standards.
- 2. Understand different types of fuel injection system and pump system.
- 3. Analyze the cooling systems depending upon the cooling requirements for particular automobile and

Understand different types of ignition systems used in case of an automobile.

- 4. Understand the power transmission in automobile gearbox and clutch system.
- 5. Understand various transmission systems, steering systems and suspension and breaking systems.

TEXT BOOKS:

- 1. Kirpal Singh, "Automobile Engineering", Vol. 1 & Vol. 2, Standard Publishers Distribution 12th Edition, ISBN Numbers: 9788180141713, 9788180141775.
- 2. K.M Gupta, "Automobile Engineering", Vol. 1 & Vol. 2, Umesh publication, 1st Edition, 2013, ISBN Numbers: <u>9788188114220</u>.

REFERENCE BOOKS:

- Heitner, "Automotive Mechanics", 2nd Ed., CBS Publishers & Distributors, ISBN-13: 978-8123908915.
- 2. P. RamiReddy, "Alternative fuels of Automobiles", Frontline publications.

Department of Mech

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME28) MAINTENANCE AND SAFETY ENGINEERING (PROFESSIONAL ELECTIVE-II)

B.Tech: VI-Semester

COURSE OBJECTIVES:-

Students will be able to

- i) Know the modern maintenance strategies
- ii) Know the various types of maintenance like preventive, corrective and inventory control in maintenance.
- iii) Know the quality maintenance processes.
- iv) Know the objective and importance of maintainability

UNIT-I

Introduction: Need for maintenance, facts and figures, modern maintenance strategy for the 21st century, engineering maintenance objectives and maintenance in equipment life cycle, terms and definitions.

Maintenance Management and control: Maintenance manual, maintenance, facility evaluation, functions of effective maintenance management, maintenance project control methods and maintenance management control indices.

UNIT-II

Types of maintenance: preventive maintenance, elements of preventative, maintenance program, establishing preventative maintenance program PM program evaluation and improvement, PM measures, PM models, corrective maintenance, corrective maintenance types, corrective maintenance steps and downtime components, corrective maintenance measures, corrective maintenance models.

Inventory control in maintenance: inventory control objectives and basic inventory decisions, ABC inventory control methods, inventory control models two bin inventory control and safety stock, spares determination factors spares calculation methods.

UNIT-III

Quality and safety in maintenance: needs for quality maintenance processes, maintenance work quality, use of quality control charts in maintenance work sampling, post maintenance testing, reasons for safety problems in maintenance, guidelines to improve safety in maintenance work, safety officer's role in maintenance work, protection of maintenance workers.

Maintenance costing: reasons for maintenance costing, maintenance budget preparation methods and steps, maintenance labor cost estimation, material cost estimation, equipment life cycle maintenance cost estimation, and maintenance cost estimation models.

UNIT-IV

Reliability, reliability centered maintenance, RCM: Goals and principles, RCM process and Associated Questions, RCM program Components effectiveness measurement indicators, RCM benefits and reasons for its failures, reliability versus maintenance and reliability in support phase, bathtub hazard rate concept, reliability measures and formulas, reliability networks, reliability analysis techniques.

110



R18-Regulations

UNIT-V

Maintainability: maintainability importance and objective, maintainability in systems, life cycle, and maintainability design characteristics, maintainability functions and measures, common maintainability design errors.

COURSE OUTCOMES:-

Students can be able to do

- 1. Understand The maintenance in equipment life cycle.
- 2. Analyse The preventive and corrective measures in maintenance.
- 3. Estimate The inventory control in maintenance.
- 4. Classify The incosting and budget preparation
- 5. Compare the reliability measures, reliability networks and reliability analysis techniques.

TEXT BOOKS:

- 1. Reliability, Maintenance and Safety Engineering By Dr. A.K.Guptha/ Laxmi Publications
- 2. Industrial Safety Management by L.M.Deshmukh / TMH

REFERENCE BOOKS :

- 1. Maintenance Engineering & Management by R.C.Mishra/ PHI
- 2. Reliability Engineering by Elsayed/ Pearson
- 3. Engineering Maintenance A modern approach, B.S Dhallon, 2002, C.R.R Publishers.

R18-Regulations

L T P C 3 0 0 3

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME29) MECHANICS OF COMPOSITE MATERIALS (PROFESSIONAL ELECTIVE-II)

B.Tech: VI-Semester

OBJECTIVES

- To make the basic understanding of linear elasticity with emphasis on the difference between isotropic and anisotropic material behavior
- to compute the elastic constants, elastic stiffness and compliance matrices using matrix algebra.
- to analyze a lamina for stress and strain tensors using Generalized Hooke's law
- to analyze a laminated plate in bending from classical laminate theory, and finding laminate properties from lamia
- Ability to predict the failure strength of a laminated composite plate using different failure theories.

UNIT-I

Introduction to Composite Materials: Introduction ,Classifications: Polymer Matrix Composites, Metal Matrix Composites, Ceramic Matrix Composites, Carbon–Carbon Composites, Fiber-Reinforced Composites and nature-made composites, and applications. Reinforcements: Fibers- Glass, Silica, Kevlar, carbon, boron, silicon carbide, and born carbide fibers. Particulate composites, Polymer composites, Thermoplastics, Thermosetts, Metal matrix and ceramic composites.

UNIT II

Micro mechanical Analysis of a Lamina: Introduction, Mass, Volume and Weight Fractions, Density and Void Content, Evaluation of Four Elastic Moduli, Strength of Materials Approach, Semi-Empirical Models, Elasticity Approach, Ultimate Strength of Unidirectional Lamina, Coefficients of Thermal Expansion, Coefficients of Moisture Expansion

UNIT-III

Macro mechanical Analysis of a Lamina: Introduction, Definitions Stress, Strain, Elastic Moduli, Strain Energy. Hooke's Law for Different Types of Materials, Hooke's Law for a Two-Dimensional Unidirectional Lamina, Plane Stress Assumption, Relationship of Compliance and Stiffness Matrix to Engineering Elastic Constants of a Lamina.

UNIT-IV

Macro mechanical Analysis of Laminates: Introduction, Classical Laminate Theory, Stress-Strain Relations for a Laminate, Laminate Code, Special Cases of Laminate Stiffness's: Single Layered Configurations, Symmetric Laminates, Anti symmetric Laminates Un symmetric Laminates, Common Laminates In-Plane and Flexural Modulus.

UNIT-V

Failure Analysis of Laminates: Introduction, Strength failure Theories: Maximum Stress Failure Theory, Maximum Stain Failure Theory, Tsai-Hill Failure Theory, Tsai-Wu Failure Theory, Failure Analysis and Design of Special Cases of Laminates, Applications, Failure Criterion for a Laminate.

COURSE OUTCOMES:-

Student will able to

- 1. Highlight the appropriate use of composite materials in the industry
- 2. Understand the significance of replacing existing metal structures with composite materials whenever beneficial
- 3. Comprehend the complexity of design of composite materials and structures
- 4. Apply knowledge of mechanics of composite materials for analyzing advanced materials involved in current trends and research area
- 5. Apply the knowledge of composite materials for designing structures for aerospace applications and smart structures

TEXT BOOKS:

- 1. R. M. Jones, Mechanics of Composite Materials, Mc Graw Hill Company, New York, 1975.
- 2. Engineering Mechanics of Composite Materials by Isaac and M Daniel, Oxford University Press, 1994.

REFERENCES:

- 1. B. D. Agarwal and L. J. Broutman, Analysis and performance of fibre Composites, Wiley-Interscience, New York, 1980.
- 2. Mechanics of Composite Materials, Second Edition (Mechanical Engineering), By Autar K. Kaw ,Publisher: CRC
- 3. L. R. Calcote, Analysis of Laminated Composite Structures, Van Nostrand Rainfold, New York, 1969.

Department of Mech

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME30) REFRIGERATION & AIR CONDITIONING (PROFESSIONAL ELECTIVE-II)

B.Tech: VI-Semester

COURSE OBJECTIVES:

- 1. Understand the basics and the working principle of Air refrigeration system
- 2. Understand the working principle of vapour compression refrigeration system.
- 3. Understand the working principle of vapour absorption refrigeration system.
- 4. Draw T-S, p-V and p-h diagrams and able to use psychometric chart in solving practical problems.
- 5. Know various REFRIGERATION & AIR CONDITIONING equipments.
- 6. Calculate various heat loads to design air conditioning system for comfort and industrial applications.

UNIT – I

INTRODUCTION TO REFRIGERATION

Necessity and applications – Unit of refrigeration and C.O.P. – Mechanical Refrigeration – Types of Ideal cycles of refrigeration.

Air Refrigeration: Bell Coleman cycle and Brayton Cycle, Open and Dense air systems – Actual air refrigeration system problems – Refrigeration needs of Air craft, different types of air conditioning systems in aircrafts.

UNIT – II

VAPOR COMPRESSION REFRIGERATION

Working principle and essential components of simple vapor compression refrigeration cycle - COP - Representation of cycle on T-S and p-h charts - effect of sub cooling and super heating - cycle analysis - Actual cycle Influence of various parameters on system performance - Use of p-h charts - numerical problems.

Principles of Evaporators: Classification – Working principles expansion devices – Types – Working principles.

Refrigerants – Desirable properties – classification refrigerants used – Nomenclature – Ozone Depletion – Global Warming.

UNIT – III

VAPOR ABSORPTION SYSTEM

Calculation of max COP – description and working of NH_3 – water system and Li Br – water (Two shell & Four shell) System. Principle of operation Three Fluid absorption system, salient features.

Steam Jet Refrigeration System: Working principles and Basic Components, Principle and operation of (i) Thermoelectric refrigerator (ii) Vortex tube or Hilsch tube.

UNIT – IV

INTRODUCTION TO AIR CONDITIONING

Specific humidity, relative humidity, degree of saturation, dry bulb temperature, wet bulb temperature.

Psychrometric Properties & Processes – Characterization of Sensible and latent heat loads – Need for Ventilation, consideration of infiltration – Load concepts of RSHF, GSHF – Problems, Concept of ESHF and ADP.

R18-Regulations

L T P C 3 0 0 3

R18-Regulations

Requirements of human comfort and concept of effective temperature – Comfort chart – Comfort Air conditioning – Requirements of Industrial air conditioning, Air conditioning Load calculations.

UNIT – V

AIR CONDITIONING SYSTEMS

Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, fans and blowers, Heat pump – Heat sources – different heat pump circuits.

COURSE OUTCOMES:

Students will be able to:

- 1. Understand all the basic principles of refrigeration.
- 2. Prepare a model refrigeration system and designing various components according to the requirement.
- 3. Design an A.C. unit by calculating the heat loads.
- 4. Observe and analyze large capacity units like ice plants, cold storages and central A.C. units.
- 5. Know all Psychrometric properties and processes.

TEXT BOOKS:

- 1. CP Arora, "Refrigeration and Air Conditioning", TMH, 2nd Edition, ISBN Number: 978-0074630105.
- 2. SC Arora & Domkundwar, "A Course in Refrigeration and Air conditioning", Dhanpatrai, ISBN : 9780000229663.

REFERENCE BOOKS:

- 1. P.I. Bellaney, "Refrigeration and Air Conditioning", Jain Book Depot. 2nd Ed., ISBN Number: 817409136X.
- 2. R.S.Khurmi & J.K.Gupta, "Refrigeration and Air conditioning", S.Chand, Eurasia Publishing House (P) Ltd., 1st Edition, ISBN No. 9788121927819.

Department of Mech

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME31) HEAT TRANSFER LAB

B.Tech: VI-Semester

COURSE OBJECTIVES:

- 1. To know about various measuring instruments Thermocouples, Voltmeter, Ammeter, etc. To demonstrate experimental principles.
- 2. To explain basic heat transfer principles. To determine thermal conductivity of various materials like magnesium oxide, brass rod, asbestos, saw dust.
- 3. To perform experiments on Cartesian, cylindrical and spherical coordinate system experiments separately.
- 4. To determine the overall heat transfer coefficient in case composite walls and heat exchanger.
- 5. To know the efficiency, temperature distribution of a pin fin. To understand a black body and know emissivity any other gray body.

LIST OF EXPERIMENTS

(Perform any TEN Experiments)

- 1. Composite Slab Apparatus Overall heat transfer co-efficient.
- 2. Heat transfer through lagged pipe.
- 3. Heat Transfer through a insulating powder.
- 4. Thermal Conductivity of given metal rod.
- 5. Heat transfer in pin-fin
- 6. Experiment on unsteady state Heat Conduction
- 7. Heat transfer in forced convection apparatus.
- 8. Heat transfer in natural convection
- 9. Parallel and counter flow heat exchanger.
- 10. Emissivity measurement apparatus.
- 11. Stefan Boltzmann Apparatus.
- 12. Critical Heat flux apparatus

COURSE OUTCOMES:

The students will be able to

- 1. Student is able to analyze and conduct the experiments to know the heat transfer and temperatures.
- 2. Student is able to interpret the experimental knowledge in the real life situation like in, electric iron, and refrigerator.
- 3. Student is able to possess the application knowledge of engine radiation, air condition chambers, solar collectors etc.
- 4. Student can design a heat transfer system to cool the given component to required temperature within the desired time.

R18-Regulations

L T P C 0 0 3 1.5

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18EN03) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

B.Tech: VI-Semester	\mathbf{L}	Т	Р	С
	0	0	3	2

Prerequisites: ENGLISH LANGUAGECOMMUNICATION SKILLS LAB

1. Introduction

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

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gather ideas and information to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice-versa.
- Take part in social and professional communication.

2. Course Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

SYLLABUS CONTENT

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. Fundamentals of Inter-personal Communication and Building Vocabulary -Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations and Discourse Skills- using visuals -Synonyms and antonyms, word roots, one-word substitutes, prefixes and

suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations and usage of vocabulary.

- 2. **Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
- 3. Writing Skills Structure and presentation of different types of writing *letter writing/Resume writing/e-correspondence/Technical report writing/Portfolio writing* planning for writing improving one's writing.
- Presentation Skills Oral presentations (individual and group) through JAM sessions/seminars/<u>PPTs</u> and written presentations through posters/projects/reports/ e-mails/assignments etc.
- Group Discussion and Interview Skills Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference and videoconference and Mock Interviews.

Minimum Requirement:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P IV Processor, Hard Disk 80 GB, RAM–512 MB Minimum, Speed 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

Prescribed Lab Manual: A book titled *A Course Book of Advanced Communication Skills Lab* published by Universities Press, Hyderabad.

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner's Compass, 8th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from 'train2success.com'
 - Preparing for being Interviewed
 - Positive Thinking
 - > Interviewing Skills
 - > Telephone Skills

Department of Mech

R18-Regulations

B.Tech-MECH

- Time Management
- > Skillmate
- Presentation skills, Cambridge (with VCD)

Books Prescribed:

- 1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
- 2. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
- 3. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
- 4. **Technical Communication** by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
- 5. **Business and Professional Communication:** Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.

Suggested Books:

- 1. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
- 2. English Vocabulary in Use series, Cambridge University Press 2008.
- 3. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
- 4. **Handbook for Technical Communication** by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
- 5. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
- 6. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
- 7. Job Hunting by Colm Downes, Cambridge University Press 2008.
- 8. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
- 9. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
- 10. Books on **TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/Cambridge University Press.
- 11. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.
- 12. Towards Career Advancement Excerpts from a Professor's Folio by P. Satyanarayana Prof. of English, Vaagdevi College of Engineering, published by Vaagdevi Group of Colleges Engineering, Warangal (T.S.) India, 2015.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

- The practical examinations for the Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
- For the English Language lab sessions, there shall be continuous evaluation during the year for 30 sessional marks and 70 End Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

- Seminar/ Professional Presentation
- A Report on the same has to be prepared and presented.
- Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
- Not more than two students to work on each mini project.
- Students may be assessed by their performance both in oral presentation and written report.

COURSE OUTCOMES

- CO 1: Developing effectively and appropriate vocabulary to be used contextually.
- CO 2: Inculcating flair for Writing and felicity in written expression.
- **CO 3:** Enhancing job prospects.
- CO 4: Acquiring effective speaking abilities

Department of Mech

B.Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME32) CAD/CAM

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. To know the computers in industrial manufacturing and use of hardware and software components in CAD/CAM systems.
- 2. To analyze the difference between 2D & 3D transformations in computer graphics applications.
- 3. To construct the database models and geometric modeling features. To know the drafting and modeling systems used in CAD/CAM. Solid modeling features and applications.
- 4. To distinguish between NC (Numerical Control), CNC & DNC in CAD/CAM.
- 5. To know about the group technology approaches for manufacturing industries.
- 6. To analyze the QC (Quality Control) and CAQC (Computer Aided Quality Control) functions

UNIT – I

COMPUTERS IN INDUSTRIAL MANUFACTURING

Introduction: Computer configuration for CAD Applications, Computer Peripherals for CAD

Product cycle, CAD/CAM Hardware, Basic structure, CPU, Memory types, input devices, display devices, hard copy devices, storage devices.

Computer Graphics: Virtual reality, Hidden lines, Hidden surfaces, Z-buffer, Pointers, Area sub-division, Scan line algorithm. , database structure for graphics, modeling, transformation of geometry, 3D transformations, mathematics of projections, clipping.

UNIT – II

GEOMETRIC MODELING

Requirements, geometric models, geometric construction models, curve representation methods-Hermite Cubic spline, Bezier curve, B-spline

Surface representation methods-Plane Surface, Surface of Revolution, tabulated cylinder. Solid modeling-Boundary representation, Constructive solid geometry

Drafting and Modeling Systems: Basic geometric commands, layers, display control commands, editing, dimensioning.

UNIT – III

NUMERICAL CONTROL

NC, NC modes, NC elements, NC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming: fundamentals, manual part programming methods, computer aided part programming.

UNIT – IV

GROUP TECHNOLOGY: Part family, coding and classification, production flow analysis, advantages and limitations.

Computer Aided Quality Control: Terminology in quality control, the computer in QC, contact inspection methods, noncontact inspection methods-optical, noncontact inspection methods- Non-optical, computer aided testing, integration of CAQC with CAD/CAM.

R18-Regulations

LTPC

0 3

3 0

UNIT – V

COMPUTER AIDED PROCESS PLANNING: Retrieval CAPP, Generative CAPP, Hybrid system.

Case Studies- Web Integrated Manufacturing, JIT production control by Kanban, Toyota integrated product development, Indian Manufacturing Scenario.

COURSE OUTCOMES:

The students will be able to

- 1. Observe the various input and output devices used in CAD/CAM systems.
- 2. Understand 2D and 3D transformations problems .
- 3. Write the programs for different models by using NC part programming.
- 4. Analyze the Group Technology (GT)
- 5. Differentiate CAQC (Computer Aided Quality Control) and CIM (Computer Integrated Manufacturing) systems.

TEXT BOOKS:

- 1. A Zimmers & P.Groover, "CAD/AM", PE/PHI, 1st Ed., ISBN Number: 978-8177584165.
- Ibrahim Zeid, "CAD/CAM Theory and Practice", TMH, 2nd Ed., ISBN Number: 978-0070151345.

REFERENCE BOOKS:

- 1. Lalit Narayan, "Computer Aided Design and Manufacturing", PHI, ISBN: 978-81-203-3342-0.
- 2. Radhakrishnan and Subramanian, "CAD/CAM/CIM", New Age, 3rd Ed., 2007, ISBN-13: 9788122412482.

R18-Regulations

LTPC 3 0

0 3

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME33) INSTRUMENTATION AND CONTROL SYSTEMS

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. to know the measurement systems, performance characteristics, errors classification and elimination.
- 2. to analyze the concepts of displacement, temperature, pressure measurement, calibration procedures and their applications.
- 3. to know about the measurements of level, flow, speed, acceleration and vibration.
- 4. to understand the concepts of stress strain, humidity, force, torque and power measurement devices. to know the elements of control systems with block diagrams and their applications in temperature control, numerical control and servo control.

UNIT – I

Definition- Basic principles of measurement- Measurement - Measurement systems, generalized configuration and function descriptions of measuring instruments- examples. Static and Dynamic performance characteristics- sources of error, Classification and elimination of error

UNIT – II

Measurement of Displacement: Theory and construction of various transducers to measure displacement – Piezo electric, Inductive, capacitance, resistance ionization and photo electric transducers, Calibration procedures.

Measurement of Temperatures: Classification - Ranges - Various principles of measurements - Expansion, Electrical Resistance - Thermistor - Thermo couple -Pvrometers – Temperature indicators.

Measurement of Pressure: Units- classification – different principles used. Manometers, Piston, Bourdon pressure gauge, Bellows- Diaphragm gauges. Low pressure measurement -Thermal conductivity gauges – ionization pressure gauges, McLeod pressure gauge.

UNIT – III

Measurement of Level: Direct method – Indirect methods – capacitative, ultrasonic, magnetic, cryogenic fuel level indicators- Bubbler level indicators.

Flow Measurement: Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot - wire anemometer, Laser Doppler Anemometer (LDA).

Measurement of Speed: Mechanical Tachometers - Electrical Tachometers - Stroboscope, Non- contact type of tachometer.

Measurement of Acceleration and Vibration: Different simple instruments - Principles of Seismic instruments – Vibrometer and accelerometer using this principle.

UNIT - IV

Stress Stain Measurements: Various types of stress and strain measurements - 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.

Measurement of Humidity: Moisture content of gases, Sling psychrometer, Absorption psychrometer, Dew point meter.

Measurement of Force, Torque and Power: Elastic force meters, load cells, Torsion meters, Dynamometers.

Department of Mech

UNIT – V

Elements of Control Systems: Introduction, Importance – Classification – Open and closed systems Servomechanisms, transfer Function - Examples with block diagrams – Temperature, speed and position control systems.

COURSE OUTCOMES:

- 1. Gain knowledge on various parts of machine and IC engine. Understand the design construction of machine parts.
- 2. To gain knowledge of functioning of parts such as connecting rod, eccentric etc.
- 3. To understand how heat and electricity are combined in calibrating thermoelectric devices, especially resistance temperature detector, thermo couple.
- 4. To measure the displacement using LVDT transducer. To gain knowledge on flow measurement using rotometer.
- 5. Classify Open and closed systems Servomechanisms.

TEXT BOOKS:

1. Measurement systems: Applications & Design/ D.S. Kumar/ Anuradha Agencies.

2. Instrumentation, measurement & analysis / B. C. Nakra & K.K. Choudhary/THM.

REFERENCE BOOKS:

1. Principles of industrial Instrumentation and Control systems/ Chennakesava R Alavala/ Cengage Learning.

- 2. Instrumentation and control systems / S. Bhaskar/ Anuradha agencies.
- 3. Experimental Methods for Engineers/ Holman/ McGraw Hill.
- 4. Mechanical and Industrial Measurements/ R.K. Jain/ Khanna Publishers.
- 5. Mechanical Measurements / Sirohi and Radhakrishna / New Age.
- 6. Instrumentation & Mech. Measurements/ A.K.Tayal / Galgotia Publications.

surface and

THERMAL METAL REMOVAL PROCESSES General Principle and applications of Electric Discharge Machining, Electric Discharge Grinding and electric discharge wire cutting processes – Power circuits for EDM, Mechanics of metal removal in EDM, Process parameters, selection of tool electrode and dielectric fluids, methods surface finish and machining accuracy, characteristics of spark eroded

machine tool selection. Wire EDM, principle, applications.

problems for estimation of metal removal rate. Fundamentals of chemical machining, advantages and applications, maskants and etchants. UNIT – III

abrasive water jet machining. Basic principles, equipments, process variables, mechanics of metal removal, performance Evaluation, applications and limitations. Electro - Chemical Processes : Fundamentals of electro chemical machining, electrochemical grinding, electro chemical honing and deburring process, metal removal rate in ECM, Tool design, Surface finish and accuracy economic aspects of ECM - Simple

limitations and recent developments. UNIT – II ABRASIVE JET MACHINING: Abrasive jet machining, Water jet machining and

processes - considerations in process selection. Materials. Applications.

for EDM process characteristics of spark evaded surface wire process

- 6. To know the metallurgical effects of surface after machining process.

UNIT – I

INTRODUCTION

Need for Unconventional machining methods-Classification of Unconventional machining

Ultrasonic machining – Elements of the process, mechanics of metal removal, constructional Details. process parameters, economic considerations, applications,

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME34) UNCONVENTIONAL MACHINING PROCESSES (PROFESSIONAL ELECTIVE-III)

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. To understand the difference between convention and unconventional machining process. To know the modern machining process and process selection for different materials.
- 2. To know the Metal Removal Rate and surface finish of different materials using different process parameters.
- 3. To know the electro chemical machining process, elements of ECM process,
- 5. To know the basic principle of electric discharge machining process, power circuits tool design, surface finish, machining accuracy and

concentration, working of tool, chemistry of the process and tool design.

4. To know the economic aspects of the different unconventional machining process.

Department of Mech

125

LTPC

0 3

3 0

B.Tech-MECH

R18-Regulations

B.Tech-MECH UNIT – IV

Theory of electron beam machining, comparison of thermal and non-thermal processes – General Principle and application of laser beam machining – thermal features, cutting speed and accuracy of cut.

UNIT – V

APPLICATION OF PLASMA FOR MACHINING

Metal removal mechanism, process parameters, accuracy and surface finish and other applications of plasma in manufacturing industries.

Magnetic abrasive finishing, Abrasive flow finishing, Electro stream drilling, shaped tube electrolytic machining.

COURSE OUTCOMES:

The students will be able to

- 1. Understand selection of processes.
- 2. Design the components of Abrasive Jet machining process.
- 3. Observe surface properties after machining without destructing the material.
- 4. Select the material with respect to process.
- 5. Apply plasma for machining like Magnetic abrasive finishing, Abrasive flow finishing etc

TEXT BOOKS:

- 1. Pandya P.C. and Shah H.S., "Modern Machining Process", TMH., 2008, 1st Edition, ISBN:9780070965539.
- 2. V.K.Jain, "Advanced Manufacturing Process", Allied publishers, Edition: 2012, ISBN-13: 978-1439852903.

REFERENCE BOOKS:

- 1. Serope Kalpakjian and Steven R.Schmid, "Manufacturing Engineering and Technology", Pearson Publications, 5th Ed. 2009, ISBN: 0132272717.Bhattacharya A, "New Technology", The Institution of Engineers, India 1984.
- 2. C.Elanchezhian, B.Vijaya Ramnath and M.Vijayan, "Unconventional Machining Processes", Anuradha Publications, 2005, ISBN Number: 9788120319585.
- 3. Unconventional Machining Processes by Bhattacharya.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME35) DESIGN FOR MANUFACTURING (PROFESSIONAL ELECTIVE-III)

B.Tech: VII-Semester

L T P C 3 0 0 3

OBJECTIVES:

- To understand various general design rules for manufacturing and criteria for material selection.
- To study various machining processes and tolerance aspects in machining.
- To know the design considerations for casting and welding processes.
- To understand the conceptual design factors to be considered in forging extrusion and sheet metal work.
- To study the general design guidelines for manual assembly and development of DFA Methodology.

UNIT-1:

Introduction: Design philosophy-Steps in Design process – General Design rules for Manufacturing – Basic principles of designing for economical production – Creativity in design.

Materials: Selection of Materials for design- Developments in Material Technology – Criteria for material section – Material selection interrelationship with process selection – process selection charts.

UNIT-II:

Machining Processes: Overview of various machining processes – general design rules for machining – Dimensional tolerance and surface roughness – Design for Machining ease – Redesigning of components for machining ease with suitable examples, General design recommendations for machined parts.

UNIT-III:

Metal Casting: Appraisal of various casting processes, general design considerations for casting – casting tolerances – Use of Solidification Simulation in casting design – Product design rules for sand casting.

Metal Joining: Appraisal of various welding processes, Factors in design of weldments – General design guidelines – pre and post treatment of welds – Effects of thermal stresses in weld joints – Design of brazed joints.

UNIT-IV:

Forging: factors of forging – Closed die forging design – parting lines of dies – Drop forging die design – General design recommendations of Extrusion, Sheet Metal Work Design guidelines for Extuded sections – Design principles for Punching. Blanking, Bending, Deep Drawing-Keeler Goodman Forming Limit Diagram – Component Design for Blanking.

UNIT-V:

Design for Assembly: General design guidelines for Manual Assembly – Development of Systematic DFA Methodology – Assembly Efficiency – Classification System for Manual insertion and Fastening – Effect of part symmetry on handling time.

COURSE OUTCOME :

- 1. Classify the steps in design process
- 2. Understand the overview of various machining processes
- 3. Apply the factors in design of weldments
- 4. Analyse general design recommendations of extrusion
- 5. Compare the development of systematic dfa methodology

TEXT BOOKS:

1. Product design for Manufacture and Assembly – Geoffrey Bothroyd, Peter Dewhurst and W.A Knight, CRC Press.

REFERENCES BOOKS:

Product design and Manufacturing – A.K Chitable and R.C Gupta. Prentice – Hall of India, New Delhi, 2003.

- 1. Design and Manufacturing Surender Kumar & Goutham Sutradhar, Oxford & IBH Publishing Co. Pvt Ltd., New Delhi, 1998.
- 2. Product Design Kevin Otto and Kristin Wood. Pearson Education.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME36) POWER PLANT ENGINEERING (PROFESSIONAL ELECTIVE-III)

B.Tech: VII-Semester

L T P C 3 0 0 3

COURSE OBJECTIVES:

- 1. Understand the sources of energy, nature and role of energy in India. To recognize and understand the different types of power plants, equipments and Layouts
- 2. Understand the working principle of Steam power plant, equipment, Coal handling systems, ash handling systems.
- 3. Understand working principle of Diesel power plant and Gas Turbine power plant .
- 4. Know components of Hydro-Electric Power plant ,Typical Layouts, Types of Dams
- 5. Know various nuclear fuels, various types of Nuclear Reactors.
- 6. Understand Power plant Economics, Load Curves, Effluents from various power plants, Environmental standards

UNIT – I

INTRODUCTION TO THE SOURCES OF ENERGY

Resources and Development of Power in India.

Steam Power Plant: Plant Layout, Working of different Circuits, Fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage. Ash handling systems.

Combustion process: Properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction. Dust collectors, cooling towers and heat rejection. Corrosion and fed water treatment.

UNIT – II

INTERNAL COMBUSTION ENGINE PLANT

DIESEL POWER PLANT: Introduction – IC engines, types, construction. Plant layout with auxiliaries. Fuel supply system, air starting equipment, lubrication and cooling system, super charging.

Gas Turbine Plant: Introduction – classification – construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Combined Cycle Power Plants and comparison.

Direct Energy Conversion: Solar energy, fuel cells, Thermo electric and Thermo ionic, NHD generation.

UNIT – III

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. Application of Hydro power plant, safety measures in Hydro power station, performance of water turbine, comparison of Hydro electric power plant and steam power plant.

UNIT – IV

NUCLEAR POWER STATION

Nuclear fuel – 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.

UNIT – V

POWER PLANT ECONOMICS AND ENVIRONMENTAL CONSIDERATIONS

Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution. Load curves, load duration curve. Definitions of connected load. Maximum demand, demand factor, average load, load factor, diversity factor – related exercises. Effluents from power plants and Impact on environment – Pollutants and pollution standards – Methods of Pollution control.

COURSE OUTCOMES:

This course helps the students to

- 1. Understand the different types of operation takes place in the power plant with its plant layout
- 2. Got knowledge about internal combustion power plants and their uses.
- 3. Explore the opportunities to improve the capacity and the efficiency of hydro electric power plant.
- 4. Understand the concept of nuclear power generation and find out the better way against radiation hazards.
- 5. Analyze the plant economics and the environmental considerations for the establishment of plant.

TEXT BOOKS

- 1. P.C.Sharma, "Power Plant Engineering", S.K.Kataria Publication, 2013, ISBN-13: 9788189757205.
- 2. Arora and S.Domkundwar, "A course in Power Plant Engineering", 2nd Edition TMH, ISBN: 9780070435995.

REFERENCE BOOKS

- 1. Rajput, "A text book of Power Plant Engineering", Laxmi Publications, ISBN No.: 978-81-318-0255-7.
- 2. Ramalingam, "Power Plant Engineering", SciTech Publishers, ISBN-13: 9788183710626.
- 3. P.K.Nag, "Power Plant Engineering": II Edition, TMH, ISBN Number: 978-0070648159.
- 4. Elanchezhian, "Power Plant Engineering", I.K. International Publications, ISBN-13: 978-8189866303.

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME37) PRODUCTION PLANNING & CONTROL (PROFESSIONAL ELECTIVE-IV)

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. Ensure efficient utilization of production facilities and to coordinate the production activities of different departments.
- 2. Maintain adequate but not excessive stock of raw materials; work in process and of finished goods to meet production requirements.
- 3. Plan delivery schedules at the most economical level.
- 4. Establishing targets and checking it against performance.
- 5. Provide alternative production strategies in case of emergencies. Have better control over stocks of raw material, Work in process and finished goods.
- 6. Ensure production of right product in right quality at the right time

UNIT – I

INTRODUCTION

Definitions – Objectives of Production Planning and Control – Functions of production planning and control – Elements of production control - Types of production - Organization of production planning and control, Internal organizations department.

Forecasting: Definition- importance of forecasting - factors affecting the forecast- types of forecasting and their uses-demand patterns - general principles of forecasting techniquesquantitative techniques- qualitative techniques- measures of forecasting errors.

UNIT – II

INVENTORY MANAGEMENT

Functions of inventories – relevant inventory costs – ABC analysis – VED analysis –Basic EOQ model- Inventory control systems –continuous review systems and periodic review systems, MRP, ERP, and JIT Systems-Basic Treatment only.

Aggregate planning: Definition – aggregate planning strategies – aggregate planning methods – transportation model.

UNIT – III

LINE BALANCING

Terminology, Methods of Line Balancing, and RPW method-Largest Candidate rule method. Routing – Definition – Routing procedure – Factors affecting routing procedure, Route Sheet.

UNIT – IV

SCHEDULING

Definition – Scheduling Policies – types of scheduling methods – difference with loading – flow shop scheduling – job shop scheduling, line of balance(LOB)-objectives-steps involved.

UNIT – V DISPATCHING

Definition – activities of dispatcher – dispatching procedures – various forms used in dispatching.

R18-Regulations



R18-Regulations

Follow up: definition – types of follow up – expediting – definition – expediting procedures-Applications of computers in planning and control.

COURSE OUTCOMES:

The students will be able to

- 1. Design and plan an economical production system.
- 2. Learn about effective utilization of plant resources
- 3. Provide alternate production strategies
- 4. Guide shop floor people for manufacturing products of required quantity.
- 5. Define dispatcher and its procedures.

TEXT BOOKS:

- 1. Samuel Elion, Elements of Production Planning and Control", ISBN-13: 9788185027098.
- 2. R.K.Jain, "Production planning and Control", Khanna publishers.

REFERENCE BOOKS:

- 1. Ravi Shankar, "Industrial Engineering and management", Galgotia Publishers, 2nd Edition, ISBN Number: 978-8175156050.
- 2. Panner Selvam, "Production Operation Management", PHI Publishers, 2nd Edition, ISBN, 8120327675, 9788120327672.
- 3. Moore, "Production Control", ISBN 13: 9780070429215.
- 4. Joseph S. Martinich, "Production and Operations Management", John Willey & Sons, 1st Edition, ISBN-13: 978-0471546320.

Department of Mech

B. Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME38) ROBOTICS

(PROFESSIONAL ELECTIVE-IV)

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. Students will be able to understand the concepts of robotics classification by coordinate system and control system.
- 2. Students will be able to determine the degrees of freedom, end effectors, electric hydraulic and pneumatic devices.
- 3. Students will possess the concepts of homogeneous transformations.
- 4. Student will understand the Jacobean problems, Newton Euler transmations.
- 5. Students will know about the actuators and feedback components, resolvers, encoders velocity sensors.
- 6. Students will be able to know the applications of robots in manufacturing.

UNIT – I INTRODUCTION

Automation and Robotics – An over view of Robotics – classification by coordinate system and control systems – Components of Industrial Robotics: Degrees of freedom – End effectors: Types of grippers: Mechanical, Magnetic, Vacuum cup – General considerations on gripper selection and design.

UNIT – II

MOTION ANALYSIS

Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angle and Axis – Homogeneous transformation – Problems.

Manipulator Kinematics: D.H.Notation– Joint coordinates and world coordinates – Forward and inverse kinematics – problems.

Differential Kinematics: Differential kinematics of planar and spherical manipulators – Jacobians – Problems.

UNIT – III

ROBOT DYNAMICS

Lagrange – Euler formulations – Newton – Euler formulations – Problems on planar two link manipulators.

$\mathbf{UNIT} - \mathbf{IV}$

TRAJECTORY PLANNING

Joint space scheme – cubic polynomial fit – Avoidance of obstacles – Types of motion – Slew motion – Joint interpolated motion – straight line motion – problems.

$\mathbf{UNIT} - \mathbf{V}$

ROBOT ACTUATORS AND FED BACK COMPONENTS

Actuators: Pneumatic and Hydraulic actuators. Electric Actuators: DC servo motors – stepper motors. Feedback components: position sensors – potentiometers, resolvers and encoders – Velocity sensors – Tactile sensors.

Robot Application in Manufacturing: Material handling - Assembly and Inspection.

R18-Regulations



COURSE OUTCOMES:

The students will be able to

- 1. Apply the knowledge of robotics in real time human life applications.
- 2. Analyse the concept of CAD/CAM and automation to the robotics.
- 3. Compare knowledge of robot applications in manufacturing like, material handling, loading and unloading etc.
- 4. Experiment the robotics to the spot and continuous arc welding and spray painting.
- 5. Relate the Robot Application in Manufacturing.

TEXT BOOKS:

- 1. Groover M P, "Industrial Robotics", Pearson Edu., 2012 1st Edition, ISBN Number: 0070265097, 9780070265097, 978-0070265097.
- 2. JJ Craig, "Introduction to Robotic Mechanics and Control", Pearson, 2008 3rd edition. ISBN-13: 978-0201543612

REFERENCE BOOKS:

- 1. Fu K S, "Robotics", McGraw Hill, 1st Ed., 2008, ISBN 13: 9780070226258.
- 2. Richard D.Klafter, "Robotic Engineering", Prentice Hall, 1st Ed., 1989, ISBN-13: 9780137820535.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME39) COMPUTATIONAL FLUID DYNAMIC S (PROFESSIONAL ELECTIVE-IV)

B.Tech: VII-Semester

L T P C 3 0 0 3

COURSE OBJECTIVES:

- 1. Describe the physical significance of each term of the governing equations for CFD.
- 2. Use a commercial CFD package to solve practical CFD problems effectively.
- 3. Develop finite difference and finite volume discredited forms of the CFD equations.
- 4. Construct computer code to solve the Euler and Navier Stokes Eqns.
- 5. Create and demonstrate verification strategies for evaluating CFD code.
- 6. Understand different algorithms of different models.

UNIT – I

INTRODUCTION

Computational Fluid Dynamics as a Research and Design Tool, Applications of Computational Fluid Dynamics.

Governing Equations of Fluid Dynamics: Introduction, Control Volume, Substantial Derivative, Divergence of Velocity, Continuity Equation, Momentum Equation and Energy Equation.

UNIT – II

MATHEMATICAL BEHAVIOUR OF PARTIAL DIFFERENTIAL EQUATIONS

Introduction, Classification of Quasi-Linear Partial Differential Equations, Eigen Value Method, Elliptic Equations, Parabolic Equations and Hyperbolic Equations.

UNIT – III

BASICS ASPECTS OF DISCRETIZATION

Introduction, Introduction of Finite Differences, Difference Equations, Explicit and Implicit Approaches, Errors and Stability Analysis, Convergence criteria and Grid Generation. **Incompressible Fluid Flow:** Introduction, Implicit Crank-Nicholson Technique, Pressure Correction Method, Computation of Boundary Layer Flow.

UNIT – IV

HEAT TRANSFER

Finite Difference Applications in Heat conduction and Convention – Heat Conduction: Steady heat conduction, in a rectangular geometry, Transient heat conduction, Finite difference application in Convective heat transfer.

UNIT – V

FINITE VOLUME METHOD

Finite volume formulations for diffusion equation, convection diffusion equation. Solution algorithm for pressure velocity coupling in steady flows. Use of Staggered grids SIMPLE Algorithm and Introduction to Turbulence and Turbulence models.

COURSE OUTCOMES:

The students will be able to

- 1. Describe Governing equations of CFD.
- 2. Analyze problems with Euler and Navier Stokes Eqns.
- 3. Evaluate CFD codes.
- 4. Analyze different models with different algorithms.
- 5. Understand Finite volume formulations for diffusion equation.

TEXT BOOKS:

- 1. John D.Anderson, "Computational Fluid Dynamics: Basics with applications", McGraw Hill 1st Ed., ISBN-13: 978-0070016859.
- 2. Tapan K.Sengupta, "Fundamentals of Computational Fluid Dynamics", University Press, ISBN: 9788173714788.

REFERENCE BOOKS:

- 1. SuhasV.Patankar, "Numerical Heat Transfer and Fluid Flow", Butter-Worth Publishers, Hemisphere Publishing Company, New York 1st Ed., ISBN Number: 978-0891165224.
- 2. Muralidhar K, "Computational Fluid Flow and Heat Transfer", Narosa Publishing House 2nd Ed., ISBN No.: 9781842651728.

Department of Mech

B.Tech-MECH

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME40) AUTOMATION IN MANUFACTURING (PROFESSIONAL ELECTIVE-V)

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. Understand the types and strategies of automation, automated flow lines.
- 2. Understand different types of circuits and tool changing methods.
- 3. Understand the transfer lines, buffer storage, assembly lines
- 4. Know the material handling systems, conveyor systems, automated guided vehicle systems
- 5. Know Adaptive control, Application of A.C. in machining operations.
- 6. Know the principles of ERP, BPE, Concurrent Engineering, and Rapid Proto Typing.

UNIT – I

INTRODUCTION

Types and strategies of automation, pneumatic and hydraulic components and circuits, Automation in machine tools, Mechanical feeding and tool changing and machine tool control transfer the automaton.

Automated flow lines: Methods or work part transport, transfer, Mechanical buffer storage control function, design and fabrication consideration.

UNIT – II

ANALYSIS OF AUTOMATED FLOW LINES

General terminology and analysis of transfer lines without and with buffer storage, partial automation, implementation of automated flow lines.

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

UNIT – III

AUTOMATED MATERIAL HANDLING

Types of equipment, functions, analysis and design of material handling systems conveyor systems, automated guided vehicle systems.

Automated storage systems, automated storage and retrieval systems; work in process storage, interfacing handling and storage with manufacturing.

UNIT – IV

ADAPTIVE CONTROL SYSTEMS

Introduction, adaptive control with optimization, Adaptive control with constraints, Application of A.C. in Machining operations. Use of various parameters such as cutting force, Temperatures, vibration and acoustic emission.

UNIT – V

BUSINESS PROCESS RE-ENGINEERING

Introduction to BPE logistics, ERP, Software configuration of BPE, concurrent Engineering, Techniques of Rapid Proto typing.

R18-Regulations

L T P C 3 0 0 3

COURSE OUTCOMES:

This course helps the students to

- 1. Analyse necessity of automating any industry and procedure to be adopted for automation.
- 2. Define different types of automated flow lines, transfer lines.
- 3. Associate all types of material handling systems and adaptive control systems.
- 4. Choose packages available for advanced techniques available in mechanical engineering.
- 5. Discuss the Techniques of Rapid Proto typing.

TEXT BOOKS:

- 1. Groover, "Automation, Production Systems and Computer Integrated Manufacturing: M.P.", PE/PHI, 3rd Edition, ISBN: 0132393212.
- 2. Yoram Coreom, "Computer control of Manufacturing Systems", ISBN: 0070353417.

REFERENCE BOOKS:

- 1. P.Radhakrishnan & S.Subrahamanyarn and Raju, "CAD / CAM/ CIM", New Age International Publishers, 3rd Edition, 2003, ISBN 13: 9788122422368.
- 2. Singh, "Approach to Computer Integrated Design and Manufacturing", John Wiley 1996, ISBN: 978-0-471-58517-6.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME41) MECHANICAL VIBRATIONS (PROFESSIONAL ELECTIVE-V)

B.Tech: VII-Semester

L T P C 3 0 0 3

COURSE OBJECTIVES:-

Students will be able to

- i) Fully understand and appreciate the importance of vibrations in mechanical design of machine parts
- ii) understand free and forced (harmonic, periodic vibrations)
- iii) Solve for the motion and the natural frequency of freely vibrating damped and undamped motion.
- iv) know about free and forced vibrations with damping of linear systems with one and two degrees of freedom.

UNIT-I:

Single Degree of Freedom System: Undamped and damped free vibration; forced vibrations coulomb damping; Response to excitation; rotating unbalance and support excitation; vibration isolation and transmissibility-Response to Non periodic Excitations :unit impulse, unit step and unit ramp functions; response to arbitrary excitations, The convolution integral; shock spectrum; System response by the Laplace Transformation method.

UNIT-II:

Two Degree Freedom Systems: Principal modes- undamped and damped free and forced vibrations; undamped vibration absorbers.

UNIT-III:

Multi Degree Freedom Systems: Matrix formulation, stiffness and flexibility influence coefficients; Eigen value problem; normal modes and their properties; Free and forced vibration by model analysis; Method of matrix inversion; Torsional vibrations of multi-rotor systems and geared systems; Discrete-Time systems.

UNIT-IV:

Frequency Domain Vibration Analysis: Over view, machine-train monitoring parameters-Data base development-vibration data acquisition-trending analysis-failure-node analysissignature analysis-root cause analysis.

UNIT-V:

Numerical Methods: Raleigh's stodola's Matrix iteration, Rayleigh-Ritz Method and Holzer's methods.

TEXT BOOKS:

- 1. Mechanical Vibrations/Groover/Nem chand and Bros.
- 2. Elements of Vibration Analysis/Meirovitch/TMH,2001.

REFERENCE BOOKS:

- 1. Mechanical Vibrations/Vp Singh/Danapathi Rai & Sons.
- 2. Mechanical Vibrations/SS Rao/Pearson,2009/4thEdition.
- 3. Mechanical Vibrations/Debabrata Nag/Wiley.
- 4. Vibration problems in Engineering/S.P.Timoshenko.

Department of Mech

R18-Regulations

- 5. Mechanical vibrations and sound engineering/A.G.Ambekar/PHI.
- 6. Theory and Practice of Mechanical Vibrations/JS Rao & K.Gupta/ New Age intl. Publishers/Ravised 2nd Edition.

COURSE OUTCOMES:-

- 1. Students acquire the ability to format mathematical models of problems in vibrations
- 2. Students will have an ability to obtain the complete solution for the motion of vibrator systems (damped & undamped subjected to non periodic forcing functions)
- 3. Students will be able to obtain design parameters and indicate methods of solutions for complicated vibratory problems.
- 4. Students will be able to solve the vibrations probems for multi degrees of freedom.
- 5. Students will be able to obtain numerical solutions in vibrations problems.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME42) NON CONVENTIONAL ENERGY SOURCES (PROFESSIONAL ELECTIVE V)

B.Tech: VII-Semester

COURSE OBJECTIVES:

To make the student

- Introduce to the technology of renewable sources of energy
- Learn about the solar radiation, its applications and radiation measuring instruments
- Learn about the various types of geothermal resources and its applications
- Study the biomass energy resources, bio-mass systems.
- Learn the methods of energy extraction from the wind and oceans learn to the technology of direct energy conversion methods

UNIT-I – I

PRINCIPLES OF SOLAR RADIATION:

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

SOLAR ENERGY COLLECTION:

Flat plate and concentrating collectors, classification

of concentrating collectors, orientation and thermal analysis, advanced collectors.

SOLAR ENERGY STORAGE AND APPLICATIONS:

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Biogas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

UNIT-IV

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, Potential in India.

OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants,

and their economics.

UNIT-V

DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations and principles

of DEC. Thermoelectric generators, see beck, pettier and joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall

L T P C 3 0 0 3

R18-Regulations

B. Tech-MECH

effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

COURSE OUTCOMES:

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

- 1. Apply the technology to capture the energy from the renewable sources like sun, Wind, ocean, biomass, geothermal.
- 2. Use different renewable energy sources to produce electrical power minimize the use of conventional energy sources to produce electrical energy
- 3. identify the fact that the conventional energy resources are depleted
- 4. Understand direct energy conversion
- 5. Learn different methods in solar energy system.

TEXT BOOKS:

1. Non-Conventional Energy Sources /G.D. Rai

2. Renewable Energy Technologies /Ramesh & Kumar /Narosa

REFERENCE BOOKS:

- 1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
- 2. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
- 3. Non-Conventional Energy Systems / K Mittal /Wheeler

4. Solar Energy/Sukhame

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME43) CAD/CAM LAB

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. To know the part drawings for various components.
- 2. To draw the part modeling using AutoCAD software package.
- 3. To determine the deflection and stresses in 2D and 3D trusses and beams by using ANSYS package.
- 4. To develop different modeling components using CREO
- 5. To develop the NC program for CNC milling and turning operations by using CADEM package
- 6. To get the idea of post processors used in NC machines.
- 1. Drafting: Development of part drawings for various components in the form of orthographic and isometric. Representation of Dimensioning and tolerances scanning and plotting. Study of script.
- 2. **Part Modeling:** Generation of various 3D Models through protrusion, revolve, shell sweep. Creation of various features. Study of parent child relation. Feature based and Boolean based modeling surface and Assembly Modeling. Study of various standard Translators. Design simple components.
- 3. a) Determination of deflection and stresses in 2D and 3D trusses and beams.

b) Determination of deflections component and principal and von-misses stresses in plane stress, plane strain and axisymmetric components.

c) Determination of stresses in 3D and shell structures (at least one example in each case)

d) Estimation of natural frequencies and mode shapes Harmonic response of 2D beam.

e) Steady state heat transfer Analysis of plane and Axisymmetric components.

4. a) Development of process sheets for various components based on tooling machines.

b) Development of manufacturing and tool management systems.

c) Study of various post processors used in NC Machines

d) Development of NC code for free form and sculptured surfaces using CAM packages.

e) Machining of simple components on NC lathe and Mill by transferring NC code from a CAM package.

f) Quality Control and inspection.

COURSE OUTCOMES:

The students will be able to

- 1. Draw the part drawings which are utilized in real time applications.
- 2. Understand the different types of stress analysis, load calculations by using ANSYS software.
- 3. Analyze 2D and 3D part drawings using AutoCAD, CREO software packages.
- 4. Develop and understand the NC part program generation by using CADEM packages.

1. Identify the different pressure gauges

- 2. Understand the different types of temperature measurements.
- 3. Analyze the calibration of capacitive transducer for angular displacement
- 4. Evaluate seismic pickup for the measurement of vibration amplitude

Department of Mech

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME44) INSTRUMENTATION AND CONTROL SYSTEMS LAB

B.Tech: VII-Semester

COURSE OBJECTIVES:

- 1. To gain knowledge about Pressure Gauges.
- 2. To know different types of temperature measurements devices.
- 3. To understand the Function of LVDT transducer.

EXPERIMENTS:

- 1. Calibration of Pressure Gauges.
- 2. Calibration of transducer for temperature measurements.
- 3. Study and Calibration of LVDT transducer for displacement measurement.
- 4. Calibration of strain gauge for temperature measurement.
- 5. Calibration of thermo couple for temperature measurements.
- 6. Calibration of capacitive transducer for angular displacement.
- 7. Study and calibration of Photo and magnetic speed pickup for the measurement of speed.
- 8. Calibration of resistance temperature detector for temperature measurement.
- 9. Study and calibration of a Rota meter for flow measurement.
- 10. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
- 11. Study and Calibration of McLeod gauge for low pressure.

At the end of the course, the student will get ability to:

COURSE OUTCOMES:

R18-Regulations

L T P C 0 0 3 1.5
R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MB06) INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE-I)

B.Tech: VIII-Semester

L T P C 3 0 0 3

Prerequisites: None

COURSE OBJECTIVES:

The course covers all aspects of the intellect: Images, names, inventions, literary works, artistic works etc. It also addresses new and upcoming areas of intellectual property (IP) like Bio Technology, domain names, creative commons, etc.

UNIT-I

Introduction to Intellectual Property Law

Types of property Intellectual Property, Agencies Responsible, The increasing importance of intellectual property Rights. The law of trademark-Purpose and functions of Trade Marks, Types of Marks, and Acquisition of trade mark Rights.(**Pg.No: 1-22**)

UNIT-II

Trade mark selection and searching – Trade mark Registration Process – Post registration Procedures

Trade mark maintenance - Transfer of Rights - Inter partes Proceeding – Infringement - Dilution New developments in Trade mark –International Trade mark Law. (**Pg.No: 42-169**)

UNIT-III

Introduction to Copyrights – Principles of Copyright Principles - The subjects Matter of Copy right – The Rights Afforded by Copyright Law – Copy right Ownership, Transfer and duration – Right to prepare Derivative works – Rights of Distribution – Rights of Perform the work Publicity Copyright Formalities and Registrations - Limitations - Copyright disputes and International Copyright Law – Semiconductor Chip Protection Act (**Pg.No: 173-312**)

UNIT –IV

The law of patents-patent searches –Patent ownership and transfer-Patent infringement-International Patent Law. (Pg.No: 319-438)

UNIT-V

Introduction to Trade Secret – Maintaining Trade Secret – Physical Security – Employee Limitation - Employee confidentiality agreement - Trade Secret Law - Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law. (**Pg.No: 439-488**)

TEXT BOOK:

1. Debirag E.Bouchoux: "Intellectual Property" 4. Cengage learning, New Delhi

B.Tech-MECH REFERENCE BOOKS :

R18-Regulations

- 1. M.Ashok Kumar and Mohd.Iqbal Ali: "Intellectual Property Right" Serials Pub.
- 2. Cyber Law. Texts & Cases, South-Western's Special Topics Collections
- 3. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw –Hill, New Delhi
- 4. J Martin and C Turner "Intellectual Property" CRC Press
- 5. Richard Stimm "Intellectual Property" Cengage Learning

COURSE OUTCOMES:

- CO-2: An ability to apply knowledge of mathematics, science and engineering to real world problem.
- CO-3: Ability to model, understand and develop complex software for system software as well as application software.
- CO-7: The broad education necessary to understand the impact of computer science and engineering solutions in the scientific, societal and human contexts.
- CO-8: A recognition of the need for, and an ability to engage in life-long learning.

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18CE53) AIR POLLUTION AND CONTROL (OPEN ELECTIVE)

B.Tech: VIII-Semester

L T P C 4 0 0 4

Course Objectives:

Student will be able to

- Develop an understanding of Air pollution Concepts
- Develop an understanding of Effects of air pollution
- Develop an understanding of Air pollution Control devices
- Develop an understanding of Air quality monitoring devices

UNIT – I

Air Pollution-Definitions, Scope, Significance and Episodes, Air Pollutants-Classifications- Natural and Artificial-Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution- stationary and mobile sources.

UNIT – II

Effects of Airpollutants on man, material and vegetation; Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT-III

Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like SO_x ; NO_x ; CO; HC etc., air-fuel ratio. Computation and Control of products of combustion.

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity; Influence of Meteorological phenomena on Air Quality- wind rose diagrams.

UNIT-IV

Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.

Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT - V

General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling. Air Quality Management – Monitoring of SPM, SO_x ; NO_x and CO Emission Standards.

R18-Regulations

TEXT BOOKS:

- 1. Air pollution by M.N.Rao and H.V.N.Rao Tata Mc.Graw Hill Company.
- 2. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

- 1. Air Pollution and Control Engineering by Noel de Nevers, McGraw Hill, 2000.
- 2. Environmental Pollution Control Engineering by Rao C.S, Wiley Eastern Limited, India, 1993.
- 3. Air pollution and control By K.V.S.G. Murali Krishna, Kaushal Publishers. Kakinada.

COURSE OUTCOMES:

After completion of this course, student should be able to

- Acquire the knowledge of Air pollution Concepts
- Acquire the knowledge of Effects of air pollution
- Acquire the knowledge of Air pollution Control devices
- Acquire the knowledge of Air quality monitoring devices

Department of Mech

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18MA07) Statistical Operations Research (OPEN ELECTIVE-III)

B. Tech. IV year I semester

L T P C 3 0 0 3

Pre-requisites: Mathematical Knowledge at pre-university level Objectives:

- To learn various concepts in operations research applications in real life.
- To understand the problem solving by the technique of Linear Programming Problems.
- To gain the knowledge of strategies by transportations problem in moving items.
- To get an idea of assigning the tasks and minimizing the time by assignment and sequencing problems.
- To select the best strategy adopted by a player and waiting time of items in the industry by game and Queuing Theory.

UNIT I

LINEAR PROGRAMMING PROBLEMS

Linear programming: Linear programming problems. Solutions: Feasible solutions, Optimum feasible solution, Graphical method, Simplex method.

UNIT II

Transportation

Transportation problems: Introduction, Mathematical formation of transportation problem Existence of solution in transportation problem, initial basic feasible solution, North West corner rule, Least cost method, Vogel's approximation method, test for Optimum Solution-In transportation problem, unbalanced transportation problem.

UNIT III

Assignment & Sequencing problems

Assignment problems: Mathematical formulation, Hungarian assignment method, maximum case in assignment, prohibited assignments, travelling salesmen problem.

Sequencing problems: Problems of sequencing, basic terms used in sequencing, processing of n-jobs through two machines, optimum sequencing algorithm, processing of n-jobs through k-machines.

UNIT IV

Game theory

Games and strategies: Introduction, two person zero sum game, maximin-minimax principle. Games without saddle points-mixed strategies-graphical solution of 2Xn and nX2 games, rectangular games by using dominance principle.

UNIT- V

Queuing Theory

Queuing Theory: Structure of a queuing system, operating characteristics of queuing system, terminology of queuing systems, arrival and service processes, pure birth-death process. Deterministic queuing models: M/M/1 Model of infinite system, M/M/1 model of finite system.

COURSE OUTCOMES:

Students who successfully complete this course should be able to:

- Find optimum solutions by various techniques of Linear Programming Problem.
- Analyze the optimum expenditure of the products by Transportation Problem.
- Find out the optimum allocation and time of the tasks.
- Examine the graphical solution of a game theory problems.
- Formulate concrete problems using Queuing theoretical approaches and gain strong knowledge and principles of Queuing Theory.

TEXT BOOKS:

- 1. Operation Research An Introduction H.A. Taha, Pearson Pvt Ltd.,
- 2. Operation Research Dr. S.D. Sharma.
- 3. Operations Research Kanti Swarup, P. K. Gupta, Manmohan.

REFERENCES:

- 1. Introductory Operation Research-H. S. Kasena & K.D. Kumar, Springer (India), Pvt. Ltd.
- 2. Operation Research- Richardson Bronson- Govindasami Naadimuthu, Tata MC- Graw Hill Company Ltd.

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME47) PLANT LAYOUT & MATERIAL HANDLING (PROFESSIONAL ELECTIVE – VI)

B.Tech: VIII-Semester

COURSE OBJECTIVES:

- 1. Understand the various types of plant layouts
- 2. Design the plant layout for different type of industries
- 3. Understand the importance of material handling in the overall production cost
- 4. Know how to avoid the bottlenecks in material handling systems.
- 5. Know the various safety measures to be taken in material handling systems
- 6. Know how to design miscellaneous equipments.

UNIT – I

Introduction-Classification of Layout, Advantages and Limitations of different layouts, Layout design procedures.

Process Layout and Product Layout: Selection, specification, Implementation and follow up, comparison of product and process layout. Overview of the plant layout.

UNIT – II

Heuristics for plant layout-ALDEP, CORELAP, CRAFT, Group Layout, Fixed position layout – Quadratic assignment model. Branch and bound method.

UNIT – III

Introduction, Material handling systems and its objectives ,material Handling principles, Classification of Material Handling equipment, Relationship of material handling to plant layout.

UNIT – IV

Importance of Material Handling Systems: Selection of material handling system. Material Handling methods- path, Equipment and function oriented systems.

UNIT – V

Methods to minimize cost of material handling-Maintenance of Material Handling equipments, Safety in handling Ergonomics of material handling equipment. Design of material handling systems, Miscellaneous equipments.

COURSE OUTCOMES:

The students will be able to

- 1. Get the knowledge of various types of material handling systems.
- 2. Understand applications of different types of plant layouts.
- 3. Get the knowledge of applications of ergonomics in material handling
- 4. Get the knowledge of designing of cost effective material handling systems.
- 5. Understand merits of different types of plant layouts.

TEXT BOOKS:

- 1. PB Mahapatra, "Operations Management", PHI, 2nd Ed. 2010, ISBN 13: 9788120339262.
- 2. Dr.KC Arora & Shinde, "Aspects of Material handling", Lakshmi Publications, 2007, s ISBN-13: 9789381159262.



R18-Regulations

Department of Mechanical Engg.

- 2. Identify and understand the basic programming codes.
- 3. Create geometry and tool paths from the specifications on a blueprint for simple parts using Master cam programming software.
- 4. Identify and define the functions of the CNC machine control.
- 5. Analyze the CNC machining center for manufacturing simple parts.

TEXT BOOKS:

- 1. Computer Control of Manufacturing Systems- Yoram Koren, Tata Mc Grw Hill, 2009.
- 2. Computer Aided Manufacturing-Elancheqhian, Sunder Selvan and Shanmuga Sunder, University Science Press, Second Edition.

Upon completion of this course, the student will be able to: 1. Understand the basic procedures and concepts of programming, set up and operation of a CNC Machining

Center.

COURSE OUTCOMES:

- like turning, grinding
- **UNIT-V:**

DNC Systems and Adaptive Control: Introduction, type of DNC systems, advantages and disadvantages of DNC adaptive control with optimization, Adaptive control with constraints, Adaptive control of machining processes

UNIT-IV:

UNIT-III:

UNIT-1:

NC Part Programming: Manual programming - Basic concepts, Point contour programming, canned cycles, parametric programming. Computer-Aided Programming: General information, APT programming, Examples APT programming problems

(2D machining only). NC programming on CAD/CAM systems, the design and implementation of post processors.

interpolators.

Tooling for CNC Machines: Interchangeable tooling system, preset and qualified tools, coolant fed tooling system,

CNC Machines Elements: Machine Structure-Guide ways-feed drives-spindles-spindle bearings. System Devices: Drives, feedback devices, counting devices.

Features of NC Machines, Fundamentals of numerical control, advantage of NC systems, classification of NC systems, point to point, NC and CNC, incremental and absolute, open and closed loop systems, Features of NC

UNIT-11:

2. To study various system devices hardware and software interpolations.

3. To Know various tooling systems used in CNC Machines.

modular fixturing, quick change tooling system, automatic head changers.

Introduction to CAD/CAM software, Automatic Tool Path generation.

Interpolators for manufacturing systems: DDA integrator, DDA hardware interpolators, CNC software

B. Tech-MECH

(B18ME48) CNC TECHNOLOGIES

(PROFESSIONAL ELECTIVE – VI)

1. Understand basic features of NC and CNC Machines and their Design Considerations.

Machine Tools, design consideration of NC machine tool, methods of improving machine accuracy.

4. Understand both Manual and Computer Aided Programming for Generating Various Contours. 5. To study about the DNC systems and Adaptive Control used for various machining process.

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

B.Tech: VIII-Semester

COURSE OBJECTIVES:

LTPC 3 0 0 3

152

R18-Regulations

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(B18ME49) JET PROPULSION & ROCKET ENGINEERING

(PROFESSIONAL ELECTIVE - VI)

B.Tech: VIII-Semester

L T P C 3 0 0 3

OBJECTIVES:

- 1. Explain the characteristics & performance of aerospace propulsion systems.
- 2. Model newly conceived racket or air breathing propulsion systems and estimate their Performance and behavior.
- 3. Carry out preliminary designs of rocket to meet specified requirements.
- 4. Carry testing and instrumentation for cryogenics like nuclear and plasma and propulsion

UNIT-I

ELEMENTS OF GAS TURBINE THEORY

Thermodynamic cycles, Open closed and semi-closed – parameters of performances – cycle modifications for improvement of performances.

JET PROPULSION

Historical sketch – reaction principle – essential features of propulsion devices – Thermal engines, Classification of – Energy flow thrust, thrust power and propulsion efficiency – Need for thermal jet engines and applications.

UNIT-II

TURBOPROP AND TURBOJET-I

Thermodynamics Cycles, plant layout essential components, principles of operation performance evaluation

TURBOPROP AND TURBOJET-II

Thrust, Augmentation and thrust reversal - contrasting with piston engine propeller plant.

UNIT-III DAMIET

RAMJET

Thermodynamic cycle, plant layout, essential components – principle of operation -performance evaluation – comparison among atmospheric thermal jet engines – serque jet and pulse jet, elementary treatment.

ROCKET ENGINES

Need for, applications – Basic principles of operations and parameters of performance classification, solid and liquid propellant rocket engines advantage, domains of application – Propellants – comparison of propulsion system.

UNIT-IV

ROCKET TECHNOLOGY I

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

UNIT-V

ROCKET TECHNOLOGY II

Testing & Instrumentation – Need for cryogenics – advanced propulsion systems, elementary treatment of electrical, nuclear and plasma arc propulsion.

R18-Regulations

COURSE OUT COMES:

- 1. Compare the characteristics & performance of aerospace propulsion systems.
- 2. Estimate their Performance and behavior of ramjets.
- 3. Analyze preliminary designs of rocket to meet specified requirements.
- 4. Identify testing and instrumentation methods for cryogenics like nuclear and plasma and propulsion
- 5. Understand the fundamentals of turbojet, ramjet and their performance evaluation.

TEXT BOOKS:

- 1. Gas Dynamics and Space Propulsion by M.C. Ramasamy, Ph.D
- 2. Gas Turbines Propulsive systems by P.R. Khajuria, S.P Dubey.

REFERENCES:

- 1. Gas turbines V Ganesan
- 2. Gas turbines / Cohen, Rogers & Sarvana. Mutloo / Addision
- 3. Rocket propulsion Sutton
