



K.S.R.M COLLEGE OF ENGINEERING

UGC-Autonomous

Kadapa, AP

www.ksrmce.ac.in

Dated: 25-06-2019

Lr./KSRMCE/Principal Office /2019-20/

Principal Office Orders

As per the decisions of the Academic Council meeting held on 15- 06 –2019 the undersigned members are been appointed as the Board of studies for Mechanical Engineering for a period of 2 years.

| S.No. | Name | Designation |
|-------|-------------------------|-------------------------|
| 1. | Dr.D.Ravikanth | Prof&HOD ME,KSRMCE |
| 2 | Prof.N.N.Kishore | Professor,IIT,Tirupati |
| 3 | Prof.M.Selvaraj | Prof&HOD NIT,Warangal |
| 4 | Prof.B.Durga prasad | Prof&HOD ,JNTUA |
| 5 | Er.U.Sreedhar | Alumni,Hyderabad |
| 6 | Sri K.Sureshkumar | Associate Prof., KSRMCE |
| 7 | Sri R.Ramakrishna Reddy | Associate Prof., KSRMCE |
| 8 | Dr.P.Srinivas | Assistant Prof., KSRMCE |
| 9 | J.Suresh babu | Assistant Prof., KSRMCE |
| 10 | Sri U.Pradeep kumar | Assistant Prof., KSRMCE |
| 11 | Sri A.Harikishore Reddy | Industry Expert |

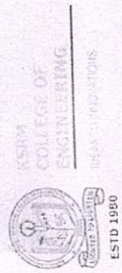
The orders will come in to force for with immediate effect.

V. S. S. Muli
Principal

Cc to:

The Management/ Director for information
The HoD of ME for necessary actions
The Members for Information
The Website Committee for upload

11/18/21, 2:23 PM



HOD ME <hod.me@ksrmce.ac.in>

Bos meeting schedule

3 messages

Thu, Sep 17, 2020 at 10:42 AM

HOD ME <hod.me@ksrmce.ac.in>
To: mukdhajntu@gmail.com

Respected sir
To day it is decided to conduct BOS meeting in view of the list of subjects for minor and honour's degree at 3 pm In seminar hall of MED. You can Attend the meeting through web, i will send you the link. Here with i am sending you the proposed list of subjects with syllabus.

HoD
Department of Mechanical Engineering,
K.S.R.M.C.E.(Autonomous),
Kadapa.

Honour_Minor_Degree_Subjects.docx
145K

Thu, Sep 17, 2020 at 10:47 AM

HOD ME <hod.me@ksrmce.ac.in>
To: nnk@iittp.ac.in

[Quoted text hidden]

Honour_Minor_Degree_Subjects.docx
145K

Thu, Sep 17, 2020 at 11:15 AM

N. N. Kishore <nnk@iittp.ac.in>
To: HOD ME <hod.me@ksrmce.ac.in>

Dear Sir:

Please excuse me, I will not able to attend the meeting as I have another meeting with our director at 2:30 pm.

Sincerely
nn kishore
[Quoted text hidden]



BOARD OF STUDIES MEETING – 2020-21
K.S.R.M COLLEGE OF ENGINEERING
AUTONOMOUS

Minutes of the Meeting

| | | | |
|-----------------|------------|-----------------|--|
| Date | 17.09.2020 | Day | Thursday |
| Time | 3PM | Venue | Virtual meeting: http://meet.google.com/oan-bqhe-pvm |
| Dept./SS | ME | Convener | Dr. D.Ravikanth |

Members Present:11

| | | Members Absent: 00 | |
|------|---------------------------|--------------------------------------|-----------|
| S.No | Name | Signature | S.No Name |
| 1. | Dr. D.Ravikanth | Prof., & HOD ME, KSRMCE | |
| 2. | Dr. N.N Kishore | Prof., in ME, IIT Tirupathi | |
| 3. | Dr. Selvaraj | Prof., in ME, NIT Warangal | |
| 4. | Dr. B.Durga Prasad | Prof., in ME, JNTUA Ananthapuramu | |
| 5. | Sri K. Suresh Kumar | Asso. Prof. KSRMCE | |
| 6. | Sri. T.V. V. S. N. Murti | Asso. Prof. KSRMCE | |
| 7. | Sri R. Rama Krishna Reddy | Asso. Prof. KSRMCE | |
| 8. | Dr. P. Sreenivas | Assistant Prof. KSRMCE | |
| 9. | Sri. J Suresh Babu | Assistant Prof. KSRMCE | |

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10. Sri. U . Pradeep Kumar

Assistant Prof.
KSRMCE

Dr.D. Ravikanth, welcomed all the members to the meeting and presented the agenda of the meeting.

The resolutions are:

| To do item | Discussion | Resolution | Coordinator/in-charge |
|--|---|---|-----------------------|
| 1 Minor Degree Course Structure & Syllabus | The Head of the Department has presented the syllabus designed by the faculty after taking the feedback from all stakeholders with premier institute syllabus . | It is resolved to amendment the honors degree and minors degree proposed. It is resolved for minor degree he / she to study 6 theory subjects and a mini project for 20 credits. The Theory are to be selected from the courses available. A) It is resolved and suggested that the mini projects of 2 credits with internal evaluation consists of three member committee. B) It is resolved that for obtaining honours degree in he / She discipline students as earn 20 credits in addition by studying 7 advanced courses, Which are not study earlier. | Dr. D.Ravikanth |
| 2 Honor's Degree Course Structure & Syllabus Regulations for Minor & Honor's Degree Course | The Head of the Department has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus | It is resolved that the syllabus for the honours & Minors degree is approved and accepted by all the members. Members along with university nominee, subject experts and chairman of BOS has decided that the Mini Project under Minor Degree course should be evaluated for 100 marks by internal committee members (HoD), Two seniors Faculty Members) and Concerned Guide by conducting Three reviews and final Project Viva – Voice Mechanical Behavior of Metals – 3 Credits Renewable Energy technology – 3 Credits Supply chain Management – 3 Credits | Sri K. Suresh Kumar |

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| | | | |
|--|---|--|---|
| | 3. Any other information for discussion | <p>The Head of the Department has presented the syllabus designed by the faculty after taking the feedback from all stake holders and comparing with premier institute syllabus.</p> | <p>Design of Manufacturing - 3 Credits Autotronics - 3 Credits Composite & Nano Materials - 3 Credits Flexible Manufacturing systems - 3 Credits Artificial Intelligence & Expert systems - 3 Credits Mechatronics - 3 Credits Concurrent Engineering - 2 Credits Industrial Safety - 2 Credits Virtual reality Systems - 2 Credits</p> |
| | | | <p>As per the suggestions given by the members amendments have been done and taken approval for the above courses</p> <p style="text-align: right;">Sri. T.V. V. S. N. Murthi</p> |

The Head of the Department have proposed the Vote of thanks and concluded the meeting.



Professor & Head
Department of Mechanical Engineering
K.S.R.M. College of Engineering
KADAPA - 516 003.

V.S.S-Murthy
Principal

K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

| Course Title | Material science and Engineering | | | | B. Tech. ME III Sem | | | |
|---|---|------------|---|---|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803306 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ul style="list-style-type: none"> To impart knowledge on the structure, The student should understand fundamental properties of materials To familiarize of various Heat treatment process & segregation of Steels & Cast irons through Iron-Iron carbide diagram Testing and applications of metals and non-metallic materials so as to identify and select suitable materials for various engineering applications. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Describe the relation between structure , properties of metals and non metallic materials | | | | | | | |
| CO 2 | Explain the mechanism of crystallization of metals | | | | | | | |
| CO 3 | Determine the grain size by using various methods for different Alloys | | | | | | | |
| CO 4 | Analyze the binary phase diagram of iron iron carbon equilibrium diagram. and (TTT) diagram for heat treatment process | | | | | | | |

UNIT I

CRYSTAL STRUCTURE OF METALS: Introduction to engineering materials and its properties and classifications, Mechanism of crystallization of metals, Recovery Recrystallization and grain growth, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

CONSTITUTION OF ALLOYS: introduction, Necessity of alloying, types of solid solutions, Hume Ruther's rules, intermediate alloy phases, and electron compounds.

UNIT II

EQUILIBRIUM DIAGRAMS: Construction of equilibrium diagrams, phase rule, Lever rule, Interpretations of phase diagrams, types of phase diagrams, Isomorphous alloy systems, eutectic, peritectic, eutectoid, and peritectoid systems and reactions.

Transformations in the solid state – allotropy, Study of important binary phase diagrams of iron-iron carbon (Fe-Fe₃C) equilibrium diagram, Effect on Alloying elements on (Fe-Fe₃C) system on steels. Relationship between equilibrium diagrams and properties of alloys of Cu-Ni and Al-Cu.

UNIT III

CAST IRON AND STEEL: Introduction to cast iron and steel, classification of cast irons, Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheroidal graphite cast iron, Alloy cast irons.

Classification of steel, structure and properties of plain carbon steel, Low alloy steel, Hadfield manganese steel, tool and die steels.

UNIT IV

HEAT TREATMENT OF ALLOYS: Importance of Heat treatment of alloys, Heat treatment cycles, Introduction to TTT diagrams, Heat treatment processes: Annealing, normalizing, tempering, Hardening, Hardenability, surface – hardening methods, Age hardening treatment.

POWDER METALLURGY: Production of metal powder condition compaction, sintering and secondary operations, advantages, limitations and applications of powder metallurgy.

UNIT V


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

Text Books:

1. Donald R. Askel, Essential of Materials Science and Engineering, , USA, 3rd Edition, Cengage Publisher, 2013.
2. V. Raghavan, Material science, PHI, 5th edition
3. Sidney H. Avner, Introduction to Physical Metallurgy, US, 2nd Edition, Tata McGraw-Hill, Noida, 2007

Reference Books:

1. R.K. Rajput, Engineering materials and Metallurgy, S chand publishers, 2nd edition, 2016
2. William D. Callister, Materials Science and Engineering, , 8th Edition, 2010
3. Agarwal, Science of Engineering Materials, TMH.


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V. S. S. Murthy
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KADAPA - 516 003. (A.P.)

| Course Title | Thermodynamics | | | | B. Tech. ME III Sem | | | |
|--|--|------------|---|---|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803307 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 0 | 0 | | | | |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ul style="list-style-type: none"> To familiarize the concepts of energy in general and heat and work in particular To study the fundamentals of quantification and grade of energy To study the effect of energy transfer on properties of substances in the form of charts and diagrams To familiarize application of the concepts of thermodynamics in vapour power, gas power cycles and lays the foundation for subsequent courses in Fluid Mechanics, Heat Transfer, Energy Systems & Technologies and other thermal engineering Courses such as Turbo machinery, Refrigeration and Air Conditioning, Power Plant Engineering etc. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Understand the concept of system, Control volume, thermodynamic properties, Thermodynamic Equilibrium, work and heat | | | | | | | |
| CO 2 | Apply the Laws of Thermodynamics to thermodynamic system | | | | | | | |
| CO 3 | Use Steam tables to define properties of steam | | | | | | | |
| CO 4 | Estimate the performance of Gas Power cycles applied to prime movers | | | | | | | |

UNIT I

Basic Concepts & Definitions:

Thermodynamics and its importance, Macroscopic and Microscopic view point, Concept of Continuum, Thermodynamic System and its types, Surrounding and Boundary, Control Volume approach and Systems approach, Equilibrium – Thermal, Chemical, Mechanical and Thermodynamic, Pure substance, State, Path, Process and Cycle, Property – Intensive and Extensive, Point Function and Path function, Quasi-Static Process, Reversible and irreversible Processes, Temperature and different scales, Zeroth Law of Thermodynamics.

Heat and Work Transfer:

Work Transfer, Displacement Work, PdV Work in various Quasi-Static Processes, Some Typical Work Forms other than PdV Work, Free Expansion Work, Net Work Done by the System, Heat Transfer, Adiabatic Process, Specific Heat, Latent Heat, Salient Features of Heat and Work Transfer.

UNIT II

First Law of Thermodynamics for a Closed System undergoing a Process, First Law of Thermodynamics for a Cyclic process, Internal Energy – a Property of the System, Enthalpy – a Property of the System, Applications of First Law of Thermodynamics to Non Flow processes, First law of Thermodynamics applied to an Open System like Steam Nozzle, Boiler, Steam Turbine, Pump, Heat Exchanger, Throttling Process, Perpetual Motion Machine of First Kind.

UNIT III

Second Law Of Thermodynamics:

Limitations of First Law of Thermodynamics, Thermal Reservoir – Source and Sink, Concept of Heat Engine, Heat Pump and Refrigerator, Second Law of Thermodynamics - Kelvin Planck and Clausius Statements, Equivalence of Kelvin Planck and Clausius Statements, Reversible and Irreversible Process, Causes of **Irreversibility**, PMM-II, Carnot theorem and its Corollaries, Thermodynamic Temperature Scale.

Entropy:

Clausius Inequality, Clausius Theorem, Concept of Entropy, Entropy – a Property of a System, Isentropic Process, Temperature Entropy plot and its relationship with heat interactions, Principle of increase in Entropy, Change of entropy of typical Processes. Third Law of Thermodynamics, Absolute entropy

UNIT IV

Properties of Gases and Gas Mixtures:

Ideal Gas, Relation among the specific heats, internal energy, Enthalpy, Analysis of Isochoric, Isobaric, Isothermal, Isentropic, isenthalpic processes, Representation of the above processes on P-V, T-s Planes, Determination of Work, Heat, Entropy and Enthalpy changes during the above processes

Gas Power Cycles:

Assumptions of Air Standard Cycle, Otto Cycle, Diesel Cycle and Dual Cycle, Comparison of Otto, Diesel and Dual Combustion Cycle, Brayton cycle and Atkinson Cycle

UNIT V

Properties of Pure Substance:

Pure substance, Phase Change Processes of pure substance, Property diagrams for Phase Change Process(T-V, T-S and P-H diagrams), Triple and Critical Points, Properties of Steam, Quality of Steam, Its determination Using Throttling and Separating-Throttling Calorimeters, Steam Processes, Expressions for the change in internal energy, enthalpy, work, heat, entropy in various processes, Mollier Chart

Steam Power Cycle:

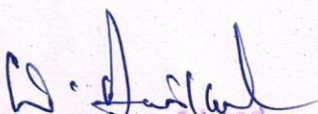
Rankine Cycle analysis, Concept of Mean Temperature of Heat Addition, Methods to improve the cycle performance- Regeneration- Reheating

Text Books:

1. P.K. Nag, Engineering Thermodynamics, Sixth Edition 2017, TMH, New Delhi
2. Claus Borgnakke & Richard E Sonntag, Fundamentals of Thermodynamics, Seventh Edition, Willey Eastern, New Delhi
3. Yunus A. Cengel & Michale A Boles, Thermodynamics: An Engineering Approach, Eighth Edition, McGraw Hill

Reference Books:

1. P. Chattopadhyay, Engineering Thermodynamics, 2nd edition, 2016, Oxford University Press India
2. Y.V.C. Rao, Engineering Thermodynamics through Examples, Revised Edition, Universities Press (India) Pvt. Ltd.
3. J.P Holman, Thermodynamics, McGraw Hill & Co
- 4.


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| | | | | | | | | |
|--|---|-------------------|---|---|--------------------------------|---------------------------------------|------------------|--------------|
| Course Title | KINEMATICS OF MACHINERY | | | | B. Tech. ME IV Sem | | | |
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803403 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | - | 0 | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ul style="list-style-type: none"> To understand the terms, types, and design related to mechanisms. To perform kinematic analysis on various mechanisms. To draw the cam profile to study about types of cams and cam terminologies. To know kinematics of gears. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Design a suitable mechanism depending on application | | | | | | | |
| CO 2 | understand the working principles of common mechanisms | | | | | | | |
| CO 3 | Analyze mechanism for finding its displacement, velocity, acceleration, | | | | | | | |
| CO 4 | understand different types of motions and various configurations of followers, by drawing | | | | | | | |

UNIT – I

MECHANISMS AND MACHINES:

Elements or Links – Classification – Rigid Link, flexible and fluid link. Types of kinematic pairs -sliding, turning, rolling, screw and spherical pairs , lower and higher pairs , closed and open pairs .Constrained motion – completely, partially or successfully constrained and incompletely constrained. Mechanisms and machines: classification of mechanisms and machines, kinematic chain, inversion of Mechanisms: inversions of quadric cycle chain, single and double slider crank chain. Mobility of mechanisms

UNIT II

STRAIGHT LINE MOTION MECHANISMS:

Exact and approximate, copiers and generated types –Peaucellier, Hart and Scott Russel – Grasshopper, Watt, Tchebicheff and Robert Mechanisms. Pantograph

STEERING MECHANISMS: Conditions for correct steering – Davis Steering gear, Ackermanns steering gear.

UNIT III

KINEMATICS:

Velocity and Acceleration Diagrams- Velocity and acceleration – Motion of link in machine –Determination of Velocity and acceleration – Graphical method – Application of relative velocity method – Slider crank mechanism, four bar mechanism. Acceleration diagrams for simple mechanisms, Coriolis acceleration, and determination of Coriolis component of acceleration.

Kleins construction. Analysis of slider crank mechanism for displacement, velocity and acceleration of slider using analytical method **INSTANTANEOUS CENTRE METHOD:** Instantaneous centre of rotation, three centres in-line theorem – locating instantaneous centres for simple mechanisms and determination of angular velocity of points and links.

UNIT IV CAMS:

Definitions of cam and follower – uses – Types of followers and cams – Terminology. Types of follower motion - Uniform velocity – Simple harmonic motion and uniform acceleration. Maximum velocity and maximum acceleration during outward and return strokes and Drawing of cam profiles .

UNIT V GEARS:

Higher pairs, friction wheels and toothed gears types, law of gearing, condition for constant velocity ratio for transmission of motion, Forms of tooth: cycloidal and involute profiles, Velocity of sliding, phenomena of interference.

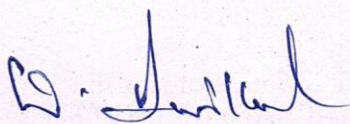
GEAR TRAINS: Introduction – Types – Simple – compound and reverted gear trains – Epicyclic gear train. Methods of finding train value or velocity ratio of Epicyclic gear trains. Selection of gear box - Differential gear for an automobile

TEXT BOOKS:

1. S.S. Rattan, Theory of Machines, Tata McGraw Hill Publishers, 4th Edition, 2015.
2. Thomas Bevan, Theory of Machines, Pearson (P) 3rd Edition, 2012
3. J.J Uicker, G.R.Pennock & J.E. Shigley, Theory of machines and Mechanisms – Oxford publishers.4th Edition, 2015

REFERENCE BOOKS:

1. R.L Norton, Kinematics and dynamics of machinery, Tata McGraw Hill Publishers, 2012
2. Sadhu Singh, Theory of Machines by Pearson (P).
3. A.Ghosh & A.K.Malik, Theory of Mechanisms and machines – East West Press Pvt. Ltd.


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| Course Title | INSTRUMENTATION AND CONTROL SYSTEMS | | | | B. Tech. ME IV Sem | | | |
|--|--|------------|---|---|-------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803405 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | - | 0 | | 3 | 30 | 70 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: <ul style="list-style-type: none"> To enable the students to understand the fundamentals of instrumentation and control available for monitoring/measuring in domestic / industrial applications. To learn fundamentals of various types of Transducers. To acquire basic understanding of principle & working of Transducers | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | select appropriate device for the measurement of parameters like temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and | | | | | | | |
| CO 2 | Analyze the fundamentals of various types of Transducers. | | | | | | | |
| CO 3 | Implement various principles & working of Transducers | | | | | | | |
| CO 4 | understand the methods to analyze the stability of systems from transfer function forms. | | | | | | | |

UNIT-I

INTRODUCTION

Definition - Basic principles of measurement - Measurement systems, generalized configuration and functional descriptions of measuring instruments - examples. 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, calibration procedures

MEASUREMENT OF TEMPERATURE: Classification - Ranges - Various Principles of measurement - Expansion, Electrical Resistance - Thermistor - Thermocouple - Pyrometers - Temperature Indicators.

MEASUREMENT OF PRESSURE: Units - classification - different principles used Manometers, Piston, Bourdon pressure gauges, Bellows - Diaphragm gauges. Low pressure measurement - Mcleod pressure gauge

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Department of Mechanical Engineering
K. J. Somaiya Institute of Engineering & Information Technology

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, Noncontact type of tachometer. Measurement of Acceleration and Vibration: Different simple instruments - Principles of Seismic instruments - Vibrometer and accelerometer.

UNIT -IV

MEASUREMENT OF STRESS & STRAIN: Various types - electrical strain gauge – gauge factor - method of usage of resistance strain gauge for bending, compressive and tensile strains - usage for measuring torque.

UNIT - V

MEASUREMENT OF HUMIDITY - Moisture content in the gases, sling psychrometer, Absorption psychrometer, Dew point meter

MEASUREMENT OF FORCE, TORQUE AND POWER- Elastic force meters, load cells, Torsion meters, Dynamometers.

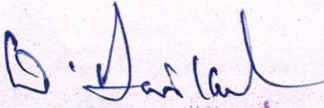
ELEMENTS OF CONTROL SYSTEMS: Introduction, Importance - Classification – Open and closed systems

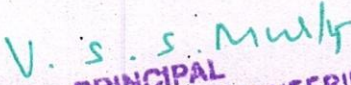
TEXT BOOKS:

1. D.S Kumar , Mechanical measurement and control Systems, 5th revised enlarged edition ,2012
2. Doebelin O. etal., Measurement systems: Application and design, , TMH 6th edition.
3. Beckwith, Marangoni, Linehard ,Mechanical Measurements , PHI, PE

REFERENCES:

1. B.C.Nakra & K.KChoudhary, Instrumentation, Measurement & Analysis, TMH, 2nd edition 2004
2. R.K. Jain ,Mechanical and Industrial Measurements , Khanna Publishers.
3. AK. Tayal , Instrumentation & Mechanical Measurements, Galgotia Publ.


Professor & Head
Department of Mechanical Engineering
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PRINCIPAL
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| course Title | HEAT TRANSFER | | | | | B. Tech. ME V Sem | | |
|---|--|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803501 | PCC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ol style="list-style-type: none"> 1. To enable the students to understand the fundamental principles and concepts of heat transfer. 2. This course provides the knowledge to understand the various modes of heat transfer like conduction, convection and radiation and also heat exchangers, fins efficiency. 3. To develop methodologies for solving a wide variety of practical engineering problems, and to provide useful information concerning the performance and design of particular systems and processes 4. To gain experience in designing experiments for thermal systems, the design, fabrication, and experimentation of a thin film heat flux gage will be attempted as part of laboratory requirements. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Formulate and analyze heat transfer system mathematically by conduction mode | | | | | | | |
| CO 2 | Apply the conduction heat transfer knowledge on fins which are used in various applications | | | | | | | |
| CO 3 | Apply the knowledge of fluid flow and convection heat transfer to analyze the thermal system | | | | | | | |
| CO 4 | perform thermal design of various heat exchangers | | | | | | | |

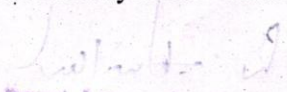
UNIT I

Introduction:

Modes, mechanisms and laws of heat transfer – Relationship between thermodynamics and heat transfer. Conduction Heat transfer: Fourier law of equation – General heat conduction equation in Cartesian, Cylindrical and spherical coordinates. One Dimensional steady state heat conduction in Homogeneous slab, hollow cylinders and spheres – Overall heat transfer coefficient – electrical analogy –with variable thermal conductivity– Composite systems and Logarithmic mean area and geometrical mean area - Critical radius / thickness of insulation - with internal heat sources or heat generation.

UNIT-II

One Dimensional Transient heat conduction: Systems with negligible internal resistance - Significance of Biot and Fourier Numbers – Chart solution of transient conduction systems –semi


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 Director of Studies

– infinite body and problems. Heat transfer through extended surfaces (or) fins: Extended surface (fins) heat transfer – Long Fin, Fin with insulated tip and short fin with problems

UNIT – III

Radiation heat transfer: Introduction, physical mechanism, radiation properties, Concept of black body, grey body - laws of black body radiation – irradiation - laws of Planck's, Wien, Kirchhoff, Lambert and Stefan Boltzman law - concept of shape factor- Emissivity – Heat exchange between grey bodies – radiation shields – problems.

UNIT –IV

Convection heat transfer: Introduction of convective heat transfer, Concepts of Continuity, Momentum and Energy equation – Classification of convection.

Forced convection:

External flows: Concepts of hydrodynamic and thermal boundary layer and use of empirical correlation for convective heat transfer for flow over – Flat plates, Cylinders and spheres.

Internal flows: Division of internal flow through concepts of Hydrodynamic and thermal entry lengths – use of empirical correlations for convective heat transfer in Horizontal pipe flow, annular flow. **Free Convection:** Development of Hydrodynamic and thermal boundary layer along a vertical plate – convective heat transfer on vertical plates and cylinders.

UNIT – V Heat Exchangers: Introduction, classification of heat exchangers – overall heat transfer coefficient and fouling factor, concepts of LMTD, Effectiveness and NTU method-problems. **Boiling and Condensation:** Principles of Boiling-Pool boiling, Regimes and determination of heat transfer coefficient in nucleate boiling, Critical heat flux and film boiling. Condensation - film wise and drop wise condensation- Nusselt's theory of condensation on a vertical plate. Introduction to mass transfer

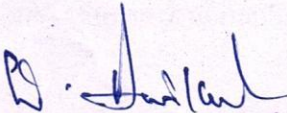
TEXT BOOKS

1. Basics of Heat and Mass Transfer-D.S.Kumar, Katsons books
2. Holman.J.P, "Heat Transfer", Tata McGraw-Hill, 2008.
3. Fundamentals of Engg.Heat and Mass Transfer – R.C. Sachdeva, 3/E New age International,2009
4. Kothandaraman.C.P, Subramanyan.S, "Heat and Mass Transfer", New age International, 7th edition, 2010

REFERENCES

1. Ozisik.M.N, "Heat Transfer", McGraw-Hill Book Co., 2003.
2. Nag.P.K, "Heat Transfer", Tata McGraw-Hill, New Delhi, 2006.
3. Heat and Mass transfer, R.K. Rajput, S.Chand & Company Ltd.,

- DATA BOOK**
1. Heat and Mass transfer –Subramanyam and Domkondwar
 2. Khurmi.R.S, "Steam Tables", S.Chand Publishers, 2012.


Professor & head
Department of Mechanical Engineering
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KADAPA - 516 003.

V. S. S. Mulu
PRINCIPAL
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KADAPA - 516 003. (A.P.)

| Course Title | METROLOGY | | | | | B. Tech. ME V Sem | | |
|--|---|------------|---|---|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803503 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | - | 0 | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| <p>Course Objectives:</p> <p>The student will learn to</p> <ol style="list-style-type: none"> 1. Inspection of engineering parts with various precision instruments. 2. Design of part, tolerances and fits. 3. Principles of measuring instruments and gauges and their uses. 4. Evaluation and inspection of surface roughness. 5. Inspection of spur gear and thread elements 6. Machine tool testing to evaluate machine tool quality | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | understand the Limits, Fits and Tolerances, Indian standard system | | | | | | | |
| CO 2 | know the principles of working of the most commonly used instruments for measuring linear and angular distances | | | | | | | |
| CO 3 | Apply different types of Comparators, optical measuring instruments, flatness measurement methods and measuring methods of surface roughness | | | | | | | |
| CO 4 | Analyze Screw thread elements and measuring methods, Gear tooth profile measurement, CMM, Alignment tests on lathe, milling and drilling machine tools. | | | | | | | |

UNIT – I

SYSTEMS OF LIMITS AND FITS: Introduction, Definitions, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly.

UNIT – II

LINEAR MEASUREMENT: Length standard, line, ends & wavelength standards slip gauges – calibration of the slip gauges, Dial indicator, micrometers.

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

LIMIT GAUGES: Plug, Ring, Snap, Gap, Taper, Profile and Position gauges. Taylor's principle

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MUMBAI

Design of Go and No Go gauges.

UNIT – III

OPTICAL MEASURING INSTRUMENTS: Tool maker's microscope – collimators, optical projector – optical flats and their uses, interferometer.

FLATNESS MEASUREMENT: Measurement of flatness of surfaces – 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 – Ra ,Rz

UNIT IV

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

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

UNIT V

GEAR MEASUREMENT: Gear measuring instruments, Gear tooth profile measurement: Measurement of diameter, pitch, pressure angle and tooth thickness. Coordinate Measuring Machines: Types of CMM and Applications of CMM.

MEASUREMENT THROUGH COMPARATORS: Comparators – Mechanical, Optical, Electrical, Electronic, Pneumatic comparators and their uses

TEXT BOOKS:

1. Engineering Metrology ,Mahajan, DhanpatRai
2. Engineering Metrology, R.K. Jain, Khanna Publ.
3. Surface Engineering for corrosion and wear resistance, JR Davis, Woodhead Publications.

REFERENCES:

1. BIS standards on Limits & Fits, Surface Finish, Machine Tool Alignment etc.
2. Fundamentals of Dimensional Metrology , Connie Dotson ,4e, Thomson
2. Handbook of Tribology: Materials, Coatings, and Surface Treatments, Bharat Bhushan and B.K.Gupta.
4. Surface Engineering with Lasers, Dehosson J.T.



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V. S. S. Murthy
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KADAPA - 516 003. (A.P.)

| course Title | Design of Machine Elements-I | | | | B. Tech. ME V Sem | | | |
|--|--|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803502 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | | 3 | 30 | 70 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ol style="list-style-type: none"> 1. To study the basic design principles and apply the principles to the design of various elements encountered in Mechanical machines and structures. 2. To determine the strength of the components. 3. To determine the failure conditions and apply them to real life Problems. 4. To design simple joints | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Understand the concepts of design and perform stress analysis on members. | | | | | | | |
| CO 2 | Design members Under the action of Fluctuating forces based on failures of theories. | | | | | | | |
| CO 3 | Analyze members having welded and riveted joints. | | | | | | | |
| CO 4 | Apply Design Procedure for cotter joints ,shaft ,Keys and couplings. | | | | | | | |

UNIT – I

INTRODUCTION: General considerations of design, design process. Engineering Materials - properties

STRESSES IN MACHINE MEMBERS: Simple stresses – Combined stresses –Torsional and bending Stresses – impact stresses – stress -strain relation-Principal stresses.

UNIT – II

THEORIES OF FAILURE – Factor of safety – Design for strength and rigidity. Concept of stiffness in tension, bending, torsion and Combined cases

STRENGTH OF MACHINE ELEMENTS: Stress concentration –notch sensitivity – Design for fluctuating stresses – Endurance limit – Estimation of Endurance strength – Gerber curve- Goodman’s line – Soderberg’s line.

UNIT – III

WELDED JOINTS: Introduction-types of welded joints- strength of transverse fillet and parallel fillet welded joints-Axially loaded unsymmetrical welded joints- Eccentrically loaded welded joints.

RIVITED JOINTS – Rivet types, rivet materials, failures of riveted joints, Joint Efficiency, Boiler Joints, Riveted Brackets, eccentrically loaded joints. Types of welded joints, Strength of butt and fillet welds, welded brackets with transverse and parallel fillet welds, eccentrically loaded welded joints.

UNIT – IV

SHAFTS: Design of solid and hollow shafts for strength and rigidity – Design of shafts for

combined bending and axial loads – Shaft sizes – BIS code.

UNIT – V

COTTER JOINTS: Design of Cotter joints: spigot and socket, sleeve and cotter-Knuckle joints.

KEYS AND COUPLINGS: Design of Rigid couplings: Muff, Split muff and Flange couplings- Bushed pin type flexible coupling.


Text Books:

1. Design of Machine Elements, V.B. Bhandari , TMH Publishers, New Delhi, 2nd edition, 2013
2. Machine Design, R.S. Kurmi and J.K. Gupta , S.Chand Publishers, New Delhi
3. Machine Design, R.K.Jain, Khanna Publishers, New Delhi.

Reference Books:

1. Machine Design, Pandya and Shah, Charotar Publishers, Anand, 17th edition, 20
2. Mechanical Engineering Design, Joseph E. Shigely, TMH Publishers, New Delhi, 9th edition, 2011
3. Design of Machine Elements, M.F. Spotts, PHI Publishers, New Delhi.
4. Machine Design, R.L. Norton, Tata McGraw Hill Publishers, 2nd edition, 2002
5. Design Data Books by K. Balaveera Reddy and Mahadevan. K

NOTE: Design data books are permitted in the examinations.



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| | | | | | | | | |
|--|--|-------------------|----------|----------|--------------------------------|---------------------------------------|------------------|--------------|
| course Title | GAS TURBINES AND JET PROPULSION | | | | B. Tech. ME VI Sem | | | |
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803604 | PEC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | | 3 | 30 | 70 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ol style="list-style-type: none"> 1. To Familiarize with basic components of gas turbine 2. To analyze the power cycles and performance predictions 3. To understand Aircraft propulsion 4. To understand different types of Rocket propulsion systems and performance prediction | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Student can analyze the simple gas turbine cycle in determining the specific work and thermal efficiency. Also, student can able to know the methods in improving them is using combinations of reheating as well as regeneration. | | | | | | | |
| CO 2 | Student can able to understand the basic principle of jet propulsion. Also, student can able to know the working of various Pilotless and piloted propulsion devices. Student can understand thrust equations, calculating propulsive power, and propulsion efficiency. Also, student can have knowledge on thrust augmentation methods. | | | | | | | |
| CO 3 | Student can analyze the working of ramjet engine thermodynamically. Student can aware the calculations related to efficiency. Student can distinguish the working of Ramjet from Pulsejet and Serquijet engines. | | | | | | | |
| CO 4 | Student can able to understand the working of rocket engine. Student can have knowledge on propellants of rocket engines. Student can aware of parameters affecting the parameters of performance. Student can get difference between various domains of application. | | | | | | | |

UNIT-I

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 RAJAPUR - ANDHRA PRADESH

Gas Turbines: gas turbine applications, gas turbine advantages & disadvantages, Simple open cycle gas turbine, deviation from ideal cycle, gas turbine with regeneration, thermal efficiency of gas turbine with & without regenerator, gas turbine engines with inter cooling & reheating.

UNIT-II

Jet propulsion: Historical sketch- reaction principle- essential features of propulsion devices- thrust; thrust power and propulsion efficiency- need for thermal jet engines and applications.

UNIT-III

Turboprop and turbojet – thermodynamic cycles, plant layout, essential components, and principles of operation – performance evaluation – thrust augmentation and Thrust reversal – contrasting with piston engine propeller plant.

UNIT-IV

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

UNIT-V


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

TEXT BOOKS:

1. Gas Turbines , V. Ganesan TMH
2. Gas Dynamics & Jet Propulsion, Dr. S.L. Somasundaram.

REFERENCES:

1. Gas turbines, Cohen , Rogers & SarvanaMuttoo , Addison Wiley & longman
2. Thermodynamics of Propulsion, Hill & Paterson.
3. Rocket Propulsion , Sutton.


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V. S. S. Naidu
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KADAPA - 516 003. (A.P.)

| course Title | COMPOSITE AND NANO MATERIALS | | | | | B. Tech. ME VIII Sem | | |
|--|--|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803803 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ol style="list-style-type: none"> To obtain knowledge on classification, processing, characterization and applications of composite materials. To obtain knowledge on mechanical properties and failure mechanisms of composites under loading conditions for engineering applications To recognize the differences between nanomaterials and conventional materials and to become familiar with a wide range of nanomaterials, their synthesis, characterization, properties and applications To understand the variety of composite materials (anisotropic material) vis a vis metals and alloys from the view point of industrial applications | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | arrive at different deformation and failure mechanisms of composite materials under different loading conditions in engineering applications | | | | | | | |
| CO 2 | Indicate how specific synthesis techniques can result in nanomaterials | | | | | | | |
| CO 3 | Knowledge on classification, processing, characterization and applications of various composite materials | | | | | | | |
| CO 4 | Describe how specific characterization techniques can be used to analyze nanomaterials | | | | | | | |

UNIT – I

INTRODUCTION TO COMPOSITES

Fundamentals of composites - need for composites – Role of Interface in Composite Performance and Durability, classification of composite materials, Particle reinforced composites - Fiber reinforced composites- structural composites Fiber glass reinforced composites- Fabrication of Fiber reinforced composites by pultrusion, Prepreg production process Applications of various types of composites

UNIT II

Particulate composites: Large-particle composites and dispersion-strengthened composites. Cermets. Zirconia toughened ceramics. Interface: Interface characteristics and their effects on

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 100010-100010

adhesive, frictional and mechanical bonding mechanisms. Coupling agents and their role on the properties composites. Interface coatings

Unit III

CERAMIC COMPOSITE MATERIALS

(Concretes) Characteristics, Various types of ceramic composite materials, Portland Cement Concretes (PCC), Reinforced Cement Concrete (RCC), Pre stressed Concrete (PC), Post Tensioning in Reinforced Concrete (PTRC), Particulate Composites- Hybrid composites, Properties and applications.

Unit IV

MODERN MATERIALS

Introduction to nano phase materials, Characteristics, properties and applications Shape memory alloys - properties and applications Smart materials alloys- properties and applications 21 Advanced Ceramics – Cermets - properties and applications

Unit v

Specific nano materials and their applications such as:

Carbon nanostructures (Nanotubes, nanohorns, graphene, buckyballs etc)

Semiconducting nanomaterials – Quantum confinement, Quantum wells, quantum wires and quantum dots. Magnetic nanomaterials – super paramagnetism , Ferroelectric, nano ceramics ,Superplasticity , Nanocomposites

Text Books:

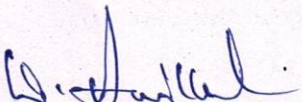
1. Mathews F.L. and Rawlings R.D., Composite materials: Engineering and Science, Chapman and Hall, London, England, 1st edition, 1994.
2. Chawla K.K., Composite materials, Springer – Verlag, 1987
3. Materials Science & Engineering, Shashi Chawla.

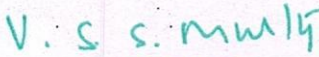
Reference Books: 1. Clyne T.W. and Withers P.J., Introduction to Metal Matrix Composites, Cambridge University Press, 1993.

2. Strong A.B., Fundamentals of Composite Manufacturing, SME, 1989.

3. Sharma S.C., Composite materials, Narosa Publications, 2000.

4. Short Term Course on Advances in Composite Materials, Composite Technology Centre, Department of Metallurgy, IIT- Madras, December 2001.


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| course Title | CAD/CAM | | | | | B. Tech. ME VII Sem | | |
|---|--|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803701 | PC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| <u>COURSE OBJECTIVE:</u> | | | | | | | | |
| <p>The course examines the area that is commonly referred to as CAD/CAM. The general objectives of the course are to enable the students to:</p> <p>Model the 3-D geometric information of machine components including assemblies, and automatically generate 2-D production drawings,</p> <p>Understand the basic analytical fundamentals that are used to create and manipulate geometric models in a computer program,</p> <p>Understand the possible applications of the CAD/CAM systems in motion analysis, structure analysis, optimization, rapid prototyping, reverse engineering and virtual engineering,</p> <p>Useful-scale CAD/CAM software systems designed for geometric modeling of machine components and automatic generation of manufacturing information.</p> | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | • Understand the engineering design process and its role in graphic communication process. | | | | | | | |
| CO 2 | Generate and interpret engineering technical drawings of parts and assemblies according to engineering design standards. | | | | | | | |
| CO 3 | Fluent application of engineering techniques, tools and resources | | | | | | | |
| CO 4 | • Effective oral and written communication in professional and lay domains | | | | | | | |

UNIT-I

Fundamentals of CAD - The design process - Applications of computers for design benefits of CAD - Computers configuration of CAD applications - Computer peripherals for CAD - Design work station - Graphics terminal.

UNIT-II

Geometry and line generation, Computer graphics: Transformations- Points and lines transformation - Translation, rotation, Scaling, Mirror Reflection; 2D and 3D transformations - - Windowing and Clipping.

UNIT-III

Curve generation - Plane curves - Space curves - Surface description and generation; modeling

concepts: 2D and 3D modeling - Wire frame, Surface and Solid modeling. B-rep solid modeling and constructive solid geometry, Bezier curve and surface representations.

UNIT-IV

CAM - Definition, Divisions of CIM: Group technology - Introduction, concepts of GT, Analysis of GT, Classification and coding system, Advances of GT, Flexible manufacturing systems (FMS) - Definition, Different flexibilities Need of FMS, Components of FMS, Difference between conventional manufacturing system and FMS, Advantages of FMS. Applications of robots in manufacturing and material handling.

UNIT V

Computer Aided Process Planning- Variant and Generative CAPP Systems.

MRP- Inputs to MRP, Benefits, Capacity Planning.

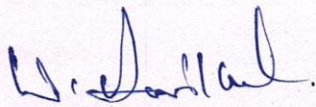
Basic concepts of Shop floor data- Types of factory data and collection systems- concepts of automatic identification methods- Bar code technology-Concepts and uses.

Text Books:

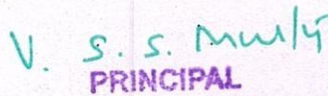
1. CAD/CAM, A Zimmers & P.Groover, PE, PHI
2. CAD/CAM-Principles and applications, P.N. Rao, TMH, 3rd edition, 2010

References:

1. Computer Graphics : Plastock Schaum Series
2. Interactive Computer Graphics: Newman & Sproul
3. Computer Graphics: Steven Hamington
4. CAD/CAM: Groover
5. Automation, Production System & CIM: M.P. Groover
6. Mathematical Elements of Computer Graphics; Rogers and Adams
7. Procedural Elements of Computer Graphics: Rogers



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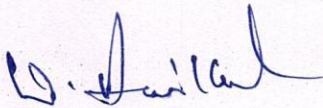
| Course Title | Mini Project | | | | | | | |
|--|---|------------|----|---|---------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803901 | PROJECT | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | -- | -- | - | 2 | 100 | -- | 100 |
| <p>Course Objective: Students will develop skills to present and defend their work in front of technically qualified audience in the field of Mechanical Engineering</p> <p>On successful completion of this course, the students will be able to</p> | | | | | | | | |
| CO 1 | Get an opportunity to work in actual industrial environment if they opt for internship. | | | | | | | |
| CO 2 | solve a live problem using software/analytical/computational tools | | | | | | | |
| CO 3 | Students will learn to write technical reports. | | | | | | | |
| <p>Syllabus Contents:</p> <p>Students can take up small problems in the field of mechanical engineering as mini project. It can be related to solution to an engineering problem, verification and analysis of experimental data available, conducting experiments on various engineering subjects, material characterization, studying a software tool for the solution of an engineering problem etc.</p> | | | | | | | | |

HADARA - 216 003
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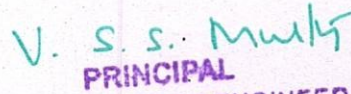
HONOUR'S DEGREE : In order to earn a Honors degree in his/her discipline, a student has to earn 20 extra credits by studying 7 advanced courses(not studied earlier) in the concerned branch of Engineering. In place of advanced courses, he/she can study equivalent MOOC courses available under SWAYAM platform .

LIST OF SUBJECTS FOR HONOURS DEGREE:

| S.No. | Course Title | No. hours Credits |
|-------|--|-------------------|
| 1 | Mechanical Behavior of Metals | 3 |
| 2 | Renewable Energy Technologies | 3 |
| 3 | Supply Chain Management | 3 |
| 4 | Design of Manufacturing | 3 |
| 5 | Autotronics | 3 |
| 6 | Composite and Nano materials | 3 |
| 7. | Mechatronics | 3 |
| 8. | Flexible manufacturing systems | 3 |
| 9. | Introduction to Artificial intelligence and expert systems | 3 |
| 10 | Concurrent Engineering | 2 |
| 11 | Industrial safety | 2 |
| 12 | Virtual reality systems | 2 |



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| course Title | MECHANICAL BEHAVIOR OF METALS | | | | | B. Tech. ME V Sem | | |
|--|---|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803507 | PEC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | | 3 | 30 | 70 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ul style="list-style-type: none"> To impart the knowledge in the fields of strengthening mechanism. To understand the creep ,fatigue and failures of metals. TO know the properties of creep ,toughness,strength,and fatigue. To know the properties of advanced and modern metallic materials. | | | | | | | | |
| 5. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | To employ the various strengthening mechanism | | | | | | | |
| CO 2 | Illustrate the fatigue properties of metals | | | | | | | |
| CO 3 | Describe the creep mechanism | | | | | | | |
| CO 4 | Illustrate the fracture and fatigue mechanism | | | | | | | |

UNIT I

BASIC CONCEPTS OF MATERIAL BEHAVIOR :

Elasticity in metals and polymers– Strengthening mechanisms, work hardening, solid solutioning, grain boundary strengthening, poly phase mixture, precipitation, particle, fibre and dispersion strengthening. Effect of temperature, strain and strain rate on plastic behaviour.– Super plasticity – . Griffith's theory,– Ductile, brittle transition in steel – High temperature fracture, creep – Larson Miller parameter – Deformation and fracture mechanism maps.

UNIT II

BEHAVIOUR UNDER DYNAMIC LOADS AND DESIGN APPROACHES :

Stress intensity factor and fracture toughness – Fatigue, low and high cycle fatigue test, crack initiation and propagation mechanisms and Paris law.- Safe life, Stress life, strain-life and fail - safe design approaches -Effect of surface and metallurgical parameters on fatigue – Fracture of non metallic materials – Failure analysis, sources of failure, procedure of failure analysis.

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UNIT III

SELECTION OF MATERIALS :

Motivation for selection, cost basis and service requirements – Selection for mechanical properties, strength, toughness, fatigue and creep – Selection for surface durability corrosion and wear resistance – Relationship between materials selection and processing –

UNIT IV

MODERN METALLIC MATERIALS :

Dual phase steels, High strength low alloy (HSLA) steel, Transformation induced plasticity (TRIP) Steel, Maraging steel, Nitrogen steel – Intermetallics, Ni and Ti aluminides – smart materials, shape memory alloys – Metallic glass and nano crystalline materials. Fabrication of glass by blowing, flat drawing and rolling

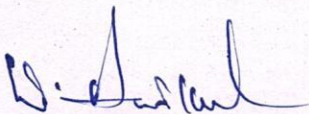
UNIT V

NON METALLIC MATERIALS :


Polymeric materials – Formation of polymer structure – Production techniques of fibers reinforced materials by pultrusion, pre preg process, adhesives and coating – structure, properties and applications of engineering polymers – Advanced structural ceramics, WC, TiC, TaC, Al₂O₃, SiC, Si₃N₄ CBN and diamond – properties, processing and applications.

REFERENCES:

1. Ashby M.F., materials selection in Mechanical Design 2nd Edition, Butter worth 1999.
2. Charles, J.A., Crane, F.A.A. and Fumess, J.A.G., Selection and use of engineering materials, (34d edition), Butterworth-Heiremann, 1997.
3. Flinn, R.A., and Trojan, P.K., Engineering Materials and their Applications, (4th Edition) Jaico, 1999.
4. George E.Dieter, Mechanical Metallurgy, McGraw Hill, 1988
5. Metals Hand book, Vol.10, Failure Analysis and Prevention, (10th Edition), Jaico, 1999.
6. Thomas H. Courtney, Mechanical Behavior of Materials, (2nd edition), McGraw Hill, 2000



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| | | | | | | | | |
|--|--|------------|---|----|-------------------------|--------------------------------|-----------|-------|
| course Title | Renewable Energy Technologies | | | | B. Tech. ME V Sem | | | |
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803508 | PE | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: <ul style="list-style-type: none"> • Explain non-conventional sources of energy. • Familiarize the principles of photo voltaic and MHD power generation. • Focuses the concepts of various renewable energy generation methods. • Outline the utilization of renewable energy sources for domestics and industrial applications. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Possess the knowledge of various renewable energy sources and their utilization | | | | | | | |
| CO 2 | Understand the solar PV, wind and MHD power generation systems | | | | | | | |
| CO 3 | Familiar with the operations of ocean, geothermal, bio-mass, battery and fuel cell energy conversion systems | | | | | | | |
| CO 4 | Compare different energy conversion systems. | | | | | | | |
| CO 5 | Apply pollution preventive measures in various energy conversion systems. | | | | | | | |

UNIT I

Introduction to sources of renewable energy and its overview and importance.

Photo voltaic power generation: Spectral distribution of energy in solar radiation, solar cell configurations, voltage developed by solar cell, photo current and load current, practical solar cell performance, commercial photo voltaic systems, test specifications for PV systems, applications of super conducting materials in electrical equipment systems.

UNIT II

MHD and Wind energy: Principles of MHD Power generation, ideal MHD generator performance, practical MHD generator, MHD technology.
Wind Energy conversion, power from wind, properties of air and wind, types of

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wind Turbines, operating characteristics.

UNIT III

Tidal energy Wave energy: Tides and tidal power stations, modes of operation, tidal project examples, turbines and generators for tidal power generation. Wave energy conversion, properties of waves and power content, vertex motion of waves, device applications. Types of ocean thermal energy conversion systems, applications of OTEC systems .

UNIT IV

Miscellaneous energy conversion systems: coal gasification and liquefaction, biomass conversion, geothermal energy, thermo electric energy conversion, principles of EMF generation, Co-generation, combined cycle co-generation, energy storage.

UNIT V

Fuel cells: Types of fuel cells, H₂-O₂ fuel cells, Application of fuel cells – Batteries, Description of Batteries, Battery application for large power. Environmental effects of energy conversion systems, pollution from coal and preventive measures, steam stations and pollution, pollution free energy systems.

TEXTBOOKS:

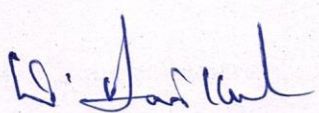
1. Wengenmayr, R. and Bührke, T. (2011), Renewable energy: Sustainable energy concepts for the future, John Wiley & Sons.
2. John Twidell & Tony Weir, Renewable Energy Resources, CRC Press , (2015).
3. G.D. Rai, Non conventional Energy sources, Khanna Publishers.

REFERENCES:

1. D.P.Kothari, K.C. Singal, Rakesh Ranjan, Renewable Energy Sources and Emerging Technologies, PHI (2009).
2. C.S.Solanki, Solar Photovoltaics: Fundamentals, Technologies and Applications, PHI 2015.
3. Rakosh Das Begamudre, Energy Conversion Systems, New age International publishers, New Delhi (2007)

E Resources:

1. nptel.ac.in/courses/112105051/
2. mnre.gov.in
3. <https://www.journals.elsevier.com/renewable-energy/>
4. www.ijrer.org


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| | | | | | | | | |
|--|---|-------------------|----------|----------|--------------------------------|--|----------------------|--------------|
| Course Title | SUPPLY CHAIN MANAGEMENT | | | | B. Tech. ME V Sem | | | |
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803509 | PEC | L | T | P | C | Contin uous Intern al Assess ment | End Exams | Total |
| | | 3 | - | 0 | 3 | | | |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| <p>Course Objectives:</p> <p>The student will able to</p> <ul style="list-style-type: none"> • Understand fundamental supply chain management concepts. • Impart knowledge and understanding to students on Supply Chain Management and its relevance to today's business decision making • Gain knowledge to evaluate and manage an effective supply chain. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Understand the Concepts of supply chain , which are aligned with business models for manufacturing and service companies and warehousing. | | | | | | | |
| CO 2 | Determine the decision support system requirements for supply chain management. | | | | | | | |
| CO 3 | Design implementation processes for partnerships, such as vendor managed inventory, that involve information sharing and shared governance of processes and infrastructure. | | | | | | | |
| CO4 | Evaluate strategic alliances for logistics and retailer-supplier relationships, such as vendor managed inventory. | | | | | | | |

UNIT I:

Supply Chain definition – Objectives – Types – Various definitions – Drivers – Need for SCM – SCM as a profession – SCM decisions and skills – Strategy formulation in SCM – Value in Supply Chain – Tradeoffs – CRM Strategy relationship matrix

UNIT II:

Strategic Sourcing – Source evaluation – collaborative perspective – BuyerSupplier Relationship – Partner Selection – develop of Partnership – importance of inventory – imbalances – uncertainties – inventory costs – inventory turnover ration

UNIT III:

Transportation Selection – Tradeoff – modes of transportation – models for transportation and distribution – factors affecting network effectiveness – 3 PL advantages – Indian transport infrastructure – IT solutions – EDI, e-Commerce, eProcurement – Bar Coding and RFID technology

UNIT IV:

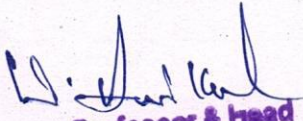
Critical business processes and information systems – DBMS – benefits of ERP –information system and bull whip effect – SCM software packages – modeling concepts – Vendor analysis model – Coordinated SCM – Simulation modeling- Reverse.Vs forward supply chain – types of reverse flows – collaborative SCM's andCPFR – agile systems – sources of variability – characteristics – supplier interface – internal processes

Unit V:

Supply Chain Management and profitability – quality management – mass customization and globalization – ethical Supply Chains – e-business and SCM – Balanced Score Card – Benchmarking, Performance measurement

Text Books:

- 1.Mohanty R.P, S.G Deshmuki “Supply Chain Management” Biztantra, New Delhi
- 2.Sunil Chopra, Peter Meindl, Dharam Vir Kalra “ supply Chain Management, Strategy, Planning, Operation” Sixth Edition, Pearson Publications


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| | | | | | | | | |
|--|---|-------------------|----------|----------|--------------------------------|---------------------------------------|------------------|--------------|
| course Title | Design For Manufacturing | | | | B. Tech. ME V Sem | | | |
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803511 | PE | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 1 | -- | | 3 | 30 | 70 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ul style="list-style-type: none"> To educate students on factors to be considered in designing parts and components with focus on manufacturability. To expose the students to dimensional tolerances, geometric tolerances and true position tolerance techniques in manufacture. To impart the knowledge on design considerations for designing components produced using various machining operations like turning, drilling, milling, grinding etc. To educate the students on design rules and recommendations for processes like casting, welding, forgings powder metallurgy and injection moulding. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Select proper materials and manufacturing processes for designing products/components by applying the relevant principles for ease and economic production. | | | | | | | |
| CO 2 | Identify faulty design factors leading to increased costs in producing mechanical components. | | | | | | | |
| CO 3 | Apply appropriate design tolerances – dimensional, geometric and true position tolerances for the production processes of mechanical components. | | | | | | | |
| CO 4 | Apply the concepts related to reducing machined areas, simplification by amalgamation and separation, clampability, accessibility etc., in the design of mechanical components. | | | | | | | |
| CO 5 | Analyse the design of castings, weldments, forgings, powder metallurgy components and suggest design modifications to reduce the cost. | | | | | | | |

UNIT-1

Introduction: Definition, need for DFM, DFM approach for cost reduction, general design guide lines of DFM, advantages and disadvantages, application of DFM in industries, Design for Quality Manufacturability, DFQM approach, designing for economical production. Design for Excellence (DFX).

Engineering Tolerancing: Basics of dimensional tolerancing, Redundancy, tolerance allocation, Review of relationship between attainable tolerance grades and different machining processes. Geometrical tolerances.

Process capability, mean, variance, skewness, kurtosis, process capability indices- C_p , and C_{pk} . Cumulative

effect of tolerance- Sure fit law and truncated normal law, problems.

UNIT-2

True positional theory: Comparison between coordinate and true position method of feature location. True position tolerance- virtual size concept, concepts of datum and changing datum, floating and fixed fasteners, projected tolerance zone and functional gages. Concept of Zero true position tolerance. Simple problems on true position tolerancing.

Selective Assembly: Interchangeable part manufacture and selective assembly. Deciding the number of groups -
 model-1: group tolerance of mating parts equal, model- 2: total and group tolerances of shaft equal. Control of axial play- introducing secondary machining operations, and laminated shims; examples.

UNIT-3

Datum Features: Functional datum, datum for manufacturing, changing the datum; examples.

Component Design: Design features to facilitate machining: drills, milling cutters, keyways, Doweling procedures, counter sunk screws, Reduction of machined area, simplification by separation, simplification by amalgamation, Design for machinability, Design for economy, Design for clampability, Design for accessibility. Designing for heat treatment, roller burnishing, and economical de-burring.

UNIT-4

Design of components with casting considerations: Pattern, mould, and parting line. Cored holes and machined holes. Identifying the possible and probable parting lines. Castings requiring special sand cores. Designing to obviate sand cores.

Welding considerations: Advantages of weldments over other design concepts, design requirements and rules, redesign of components for welding; case studies.

UNIT5

Forging considerations -requirements and rules-redesign of components for forging and case studies.

Design of components for powder metallurgy- requirements and rules-casestudies.

Design of components for injection moulding ; requirements and rules-casestudies.

Textbooks:

| SI No | Title of the Book | Name of the Author/s | Name of the Publisher | Edition and Year |
|------------------------|---|----------------------|------------------------------|------------------|
| 1 | Designing for Manufacture | Peck H | Pitman Publications | 1983 |
| 2 | Engineering Design: A Materials and processing Approach | Dieter, G.E. | McGraw Hill Co.Ltd | 2000 |
| 3 | Handbook of Products Design for Manufacturing: A Practical Guide to Low-cost Production | Bralla, James G. | McGraw Hill, New York | 1986 |
| Reference Books | | | | |
| 1 | Engineering Design | Eggert, R.J | Pearson Education, Inc., New | 2005 |

| | | | | |
|---|---|---|-------------------------------------|---------------------------|
| | | | Jersey | |
| 2 | Engineering Design | Matousek , R | Blackie and Son Limited, Glasgow | 1967 |
| 3 | Engineering Design for Manufacture | Kalandar Saheb, S.D and Prabhakar, O. | ISPE | 1999 |
| 4 | Design for Economical Production | Trucks, H.E. | Mich., Dearborn, SME | 2 nd ed., 1987 |
| 5 | Processes and Materials of Manufacture | Linberg, Roy A. | Allyn and Bacon, Boston, U.S.A. | 4 th ed., 1990 |

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| Course Title | AUTOTRONICS | | | | | B. Tech. ME VI | | |
|--|---|------------|---|---|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803605 | PEC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | - | 0 | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| <p>Course Objectives: To learn the basics of electrical and Laws.</p> <ol style="list-style-type: none"> 1) To study about the electrical safety and importance of earthing. 2) To study the construction and principle of DC Motor and its types. 3) To understand about the generator, alternator, regulator and starting motor and mechanism and the different ignition system and the lead acid battery testing. 4) To learn about the lighting system and its components in the automobile vehicle. the horn, wins screen wiper, lamps and audio systems and the electronic devices in the automotive and the sensors and electronic control unit. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Students are able to understand the knowledge on Basic Electrical supply and safety | | | | | | | |
| CO 2 | Students will know the principles of working of the battery and ignition systems | | | | | | | |
| CO 3 | Students are able to study the different types of generators, alternators, regulators & starting motor | | | | | | | |
| CO 4 | Students are able to understand various Lighting, Lamp, Horn, Gauge & Wiring and basic electronics & Computer applications in automobile. | | | | | | | |

Unit-1

BASIC ELECTRICITY & MAGNETISM

Definitions – charge, current, electromotive force, voltage, potential difference, inductance and capacitance. Explanations of electricity, properties of conductors, insulators and semiconductors, conventional theory of current flow & electron theory of current flow,

Kirchoff's law & Ohm's law, resistance & resistivity of conductors, pulsating & pure direct currents, sinusoidal & non- sinusoidal alternating currents, peak average, RMS value of AC, frequency, wavelength, amplitude, time period, single phase & three phase AC power & power factor.

Explanations of parallel(shunt) & series circuits involving source & loads, open & short circuits, importance of earthing on chassis in automotive wiring,

Magnetism, magnetic flux density, magnetic field intensity, electromagnetic induction,

Hemings' left hand & right hand rules, electromagnetic permeability, electromagnetic reluctance, application of electromagnetism in an automobile.

Unit-2

BATTERY & IGNITION SYSTEMS

Automobile electrical systems- generator, storage & distribution systems, starting system, ignition system, lighting system & accessories.

Battery- lead acid battery- construction & working, battery rating, battery testing and battery charging methods.

Requirements of ignition system, types of ignition system in engine, principles of working battery coil ignition with mechanical distributor, CB point controlled magneto ignition system, Electronic battery coil ignition systems & magneto ignition system through electrical circuit diagrams, difference between battery coil & magneto coil ignition systems

Spark plug – types, characteristics & materials, importance of ignition timing, setting ignition timing, needs & types of advance mechanism- centrifuge – vacuum advance mechanism.

Unit-3

ELECTRICAL MACHINES (GENERATORS, ALTERNATOR, REGULATOR & STARTING MOTOR)

Generator – Purposes – Construction – Field winding – Armature winding – Commutator – Brushes – Brush gears – Testing – Field winding – Armature – Growler testing – Brush – spring tension – Under cutting – Skimming commutator – Brushbedding.

Alternator – Purpose – Construction – Body – Stator winding, Rotor winding, Slip rings – Brush – Advantages of alternator – trouble shooting in the alternator and armature.

Regulator: Need for the regulator, Cut out or reverse cut out relay, Constant current and voltage regulator – compensated voltage regulator – trouble shooting in regulator – dynamo – principle.

Starting motor – Need – Working Principle – Construction – Body – Field coil – Armature windings – Poles – Commutator and brush gears – Solenoid switch. Starting motor drive mechanism – Bendix – Over running clutch type drive & coaxial drive mechanism in the heavy vehicles – complete electrical circuits of heavy duty starting motor – First contact and second contact closing – Troubles – Causes & remedies – Electric Starting circuits in two wheelers.

Unit-4

LIGHTING, LAMP, HORN, GAUGE & WIRING

Lighting - Purpose and construction of each lamp holder bulbs – Head lamps – Head Lamp Beam setting and adjustments – Halogen lamps – Sealed beam, dip switch – Beam indicator – Fog lamp – Park lamp – Rear number plate lamp – Door Lamp – Pillar Lamp – Roof Lamp – Roof light – Fluorescent lamp in transport vehicles. – brake light – Brake light switch – traffic indicators (Resistance & Transistor type) panel lamps.

Horn – Construction – Working – Hum relay – Horn circuit, horn turning, Troubleshooting. Gauges – Fuel gauge – Oil pressure gauge – Cooling water temperature gauge – Ammeter charging

indicator. Radio – Interface – Suppressors – Audio System – Wind screen wipers – Construction – Working – Troubleshooting Pneumatic type wind screen wipers.

Wiring – Single pole – Double pole – Cable size color code – wiring harness – Cable connection – fuses – Circuit breakers – Window glass panel operating system.

Unit-5

BASIC ELECTRONICS & COMPUTER APPLICATIONS IN AUTOMOBILE

Semi conductor & semi conductor materials (Intrinsic & extrinsic), P type & N type semiconductors, junction diode, forward & reverse bias, knee voltage, maximum forward current, reverse breakdown voltage, zener diodes, transistors(NPN & PNP), Half wave & full wave rectifier, Logic gates- OR, AND, NOT, NAND, EXOR & EXNOR.

Microprocessor control systems: Concept of CPU and computer memory used in automobiles.

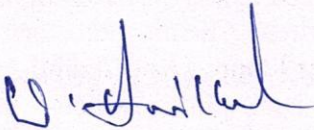
Sensors: pressure sensor, throttle position sensor, fuel flow sensor, thermistor sensor, oxygen sensor, speed sensors, knock detecting sensors solenoid and stepper motor. Electronic dashboard instruments - Onboard diagnosis system, security and warning system – ECU – principle and working of ECU.

Text Book

- 1 Automotive electrical equipments, P.L.Kohli, Tata McGraw hill publications
- 2 Automobile Electrical and Electronics Systems, Tom Denton, Arnold, London

Reference Book

- 1 Automotive electrical equipment, A.P. Young and L.Griffidis, English language book society & New press
- 2 Automotive electrical equipment, W.H. Crouse, Mc. Graw hill book co. inc. New York
- 3 Automotive Electrical and electronic system, Bosch – SAE
- 4 Automotive Electronics and Electrical equipment by William H. Crouse and DL. Anglin, McGraw Hill company.
- 5 Modern Electrical Equipment of Automoblies, Judge. A.W. Chapman & Hall, London, 1992.
- 6 Automobile Electrical Equipment, Crouse. W.H., McGraw Hill Book Co. Inc., New York, 1980.
- 7 Automobile Engineering, KM Gupta, Umesh Publishers
- 8 Automobile Engineering, RB Gupta, Satya Prakashan, New Delhi


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| course Title | COMPOSITE AND NANO MATERIALS | | | | | B. Tech. ME VIII Sem | | |
|--|--|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803803 | PEC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 1 | 1 | -- | .2 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ol style="list-style-type: none"> 1. To obtain knowledge on classification, processing, characterization and applications of composite materials. 2. To obtain knowledge on mechanical properties and failure mechanisms of composites under loading conditions for engineering applications 3. To recognize the differences between nanomaterials and conventional materials and to become familiar with a wide range of nanomaterials, their synthesis, characterization, properties and applications 4. To understand the variety of composite materials (anisotropic material) vis a vis metals and alloys from the view point of industrial applications | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | arrive at different deformation and failure mechanisms of composite materials under different loading conditions in engineering applications | | | | | | | |
| CO 2 | Indicate how specific synthesis techniques can result in nanomaterials | | | | | | | |
| CO 3 | Knowledge on classification, processing, characterization and applications of various composite materials | | | | | | | |
| CO 4 | Describe how specific characterization techniques can be used to analyze nanomaterials | | | | | | | |

UNIT – I

INTRODUCTION TO COMPOSITES

Fundamentals of composites - need for composites – Role of Interface in Composite Performance and Durability, classification of composite materials, Particle reinforced composites - Fiber reinforced composites- structural composites Fiber glass reinforced composites- Fabrication of Fiber reinforced composites by pultrusion, Prepreg production process Applications of various types of composites

UNIT II

Particulate composites: Large-particle composites and dispersion-strengthened composites. Cermets. Zirconia toughened ceramics. Interface: Interface characteristics and their effects on

adhesive, frictional and mechanical bonding mechanisms. Coupling agents and their role on the properties composites. Interface coatings

Unit III

CERAMIC COMPOSITE MATERIALS

(Concretes) Characteristics, Various types of ceramic composite materials, Portland Cement Concretes (PCC), Reinforced Cement Concrete (RCC), Pre stressed Concrete (PC), Post Tensioning in Reinforced Concrete (PTRC), Particulate Composites- Hybrid composites, Properties and applications.

Unit IV

MODERN MATERIALS

Introduction to nano phase materials, Characteristics, properties and applications Shape memory alloys - properties and applications Smart materials alloys- properties and applications 21 Advanced Ceramics – Cermets - properties and applications

Unit v

Specific nano materials and their applications such as:

Carbon nanostructures (Nanotubes, nanohorns, graphene, buckyballs etc)

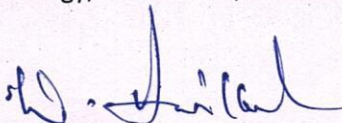
Semiconducting nanomaterials – Quantum confinement, Quantum wells, quantum wires and quantum dots. Magnetic nanomaterials – super paramagnetism , Ferroelectric, nano ceramics , Superplasticity , Nanocomposites

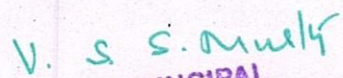
Text Books:

1. Mathews F.L. and Rawlings R.D., Composite materials: Engineering and Science, Chapman and Hall, London, England, 1st edition, 1994.
2. Chawla K.K., Composite materials, Springer – Verlag, 1987
3. Materials Science & Engineering, Shashi Chawla.

Reference Books:

1. Clyne T.W. and Withers P.J., Introduction to Metal Matrix Composites, Cambridge University Press, 1993.
2. Strong A.B., Fundamentals of Composite Manufacturing, SME, 1989.
3. Sharma S.C., Composite materials, Narosa Publications, 2000.
4. Short Term Course on Advances in Composite Materials, Composite Technology Centre, Department of Metallurgy, IIT- Madras, December 2001.


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| Course Title | CONCURRENT ENGINEERING | | | | B. Tech. ME | | | |
|---|--|------------|---|----|--------------------------------|---------------------------------------|--------------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803911 | OEC | L | T | P | C | Continuou s Internal Assessment | End Exams | Total |
| | | 2 | 0 | -- | 2 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| 1.Student can learn topics of Concurrent engineering and its Goals | | | | | | | | |
| 2.At the end of course student can learn concurrent Engineering Tools and Techniques | | | | | | | | |
| 3.Student learn Roles and Responsibilities | | | | | | | | |
| 4.At the end student can have a knowledge on JIT Systems | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Understand the principles of concurrent engineering and its implementation | | | | | | | |
| CO 2 | familiarize with the basics of concurrent engineering | | | | | | | |
| CO 3 | Apply tools and methodologies available in CE | | | | | | | |
| CO 4 | Analyze various approaches to CE | | | | | | | |

UNIT I

Introduction to Concurrent Engineering, Definitions, Historical Background, Goals of CE, Need for CE, Development process with CE Role of CAD/CAM in CE and Product life cycle

UNIT II

Concurrent Engineering Tools & Techniques, Quality function Deployment, Value function analysis, Failure Mode & Effect Analysis, Design for Manufacture & Assembly, Design for X, Taguchi's Robust Design approach, Pugh process, customer Focused Design.

UNIT III

Implementing CE in an organization, concurrent engineering teams, their roles and responsibilities, Organizational functions to support CE team environment, Setting Team goals, measuring performance of team & managing a CE Team, Limitations of team

| Course Title | Flexible Manufacturing Systems | | | | B. Tech. ME VII Sem | | | |
|---|--|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803707 | PEC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 3 | 0 | -- | | | | |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objective: To understand the design, planning and operational concepts of FMS and learn about the different tools and techniques for analyzing the same. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Understand FMS and job-shop and mass production manufacturing systems | | | | | | | |
| CO 2 | Knowledge of concept and design of flexible manufacturing cells | | | | | | | |
| CO 3 | Explore processing stations and material handling systems used in-FMS environments. | | | | | | | |
| CO 4 | Analyze the production management problems in planning, loading, scheduling, tool management and breakdown in a typical FMS. | | | | | | | |

Syllabus:

UNIT I:

Understanding of FMS: Classifications of Manufacturing Systems, Definition, Objective and Need, Components, Merits, Demerits and Applications of FMS. **Design of FMS:** Performance Evaluation, Analytical models of FMS.

UNIT II

Flexible Manufacturing Cell:

Introduction to group technology, Benefits of group technology, Part family, Methods of grouping the parts into part family: The visual inspection method, Part classification and coding system, MICLASS classification and coding system, Opitz classification system, Production flow analysis, Composite part, Limitations of group technology, Application of group technology

UNIT III :

FMS Processing Stations: Machining Centers, Turning centers, CMM, Washing/ Deburring station. Different types FMS Layouts.

UNIT IV Material Handling Systems: An introduction, Conveyor, AGV, ASRS, Robots, etc. and their salient features.

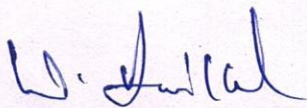
UNIT V Management Technology: Tool Management, Configuration planning and routing, Production Planning and Control, Scheduling and control, Computer Networks and Control.

TEXT BOOKS:

1. Groover, M.P. "Automation, Production Systems and Computer Integrated Manufacturing", Prentice Hall of India Pvt.Ltd. New Delhi 2009
2. Tempelmeier, H. and Kuhn, H. "Flexible Manufacturing system: Decision support for design and operation", John Wiley and Sons 2003.
3. Maleki A. "Flexible Manufacturing Systems: the technology and management". Prentice Hall International -2009
4. Analysis of production systems and Operations and production Management, Rajagopal Kurnool, CBS publishers
5. Modern Production, Operations Management, Baffa & Rakesh Sarin.
6. Production & Operations Management: Concepts, Models and Behavior, Adam & Ebert 5/e, PHI
7. Analysis of Production systems And Production and Operations Management, K.Rajagopal, CBS publishers

REFERENCES:

1. Operations Management, S.N. Chary.
2. Inventory Control Theory and Practice, Martin K. Starr and David W. Miller.
3. Production Control A Quantitative Approach, John E. Biegel.
4. Production & Operations Management, Kanishka Bedi, Oxford Univ Press.



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V. S. S. Murthy
PRINCIPAL
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| Course Title | Introduction to Artificial Intelligence & Expert Systems | | | | B. Tech. VIII ME | | | |
|---|--|------------|---|----|--------------------------------|---|------------------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803811 | OEC | L | T | P | C | Continuo us Internal Assesse nt | End Exa ms | Total |
| | | 3 | 0 | -- | | | | |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objectives: | | | | | | | | |
| <ul style="list-style-type: none"> To develop informed opinions about the present and past opinion leaders in the artificial intelligence debate. To develop a simple, informal expert system by performing an effort of knowledge engineering of a real, human expert. To develop a series of Web pages that will serve as a current "state of the art" review of the various AI application areas. To experience some actual hands-on demonstration software while accomplishing the review of current applications areas in AI. Examples of such areas might include, genetic algorithms ,Nural nets or , fuzzy logic, robotics etc. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Students Gain knowledge in applications of Artificial intelligence | | | | | | | |
| CO 2 | Know ledge on Fundamental characteristics of Expert system. | | | | | | | |
| CO 3 | Know operations of fuzzy sets. | | | | | | | |
| CO 4 | Develop steps in Neural networks and genetic algorithms. | | | | | | | |
| Unit-I | | | | | | | | |
| Artificial Intelligence : Introduction to AI, definition, , strong methods and weak methods, The history of artificial intelligence, Applications of artificial intelligence. | | | | | | | | |
| Unit-II | | | | | | | | |
| Expert systems: | | | | | | | | |
| Introduction, rules as a knowledge representation techniques, Structure of a rule-based expert system, fundamental characteristics of an expert system, forward chaining and backward chaining inference techniques, Advantages and disadvantages of rule-based expert systems. Typical expert systems: mycin, variants of mycin. | | | | | | | | |
| Unit III | | | | | | | | |

Fuzzy expert systems:

Introduction, fuzzy sets, linguistic variables and hedges, operations of fuzzy sets, Fuzzy rules, fuzzy inference, Building a fuzzy expert system

Unit-IV**Artificial neural networks:**

Introduction, the Neuron as a simple computing element, The perception, multilayer neural networks, accelerated learning in multilayer neural networks, the Hopfield network, bidirectional associative memory, self organizing neural networks

Unit-V**Genetic algorithms:**

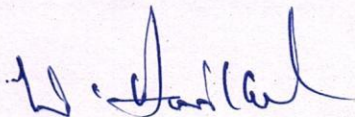
Introduction, Representations, steps in genetic algorithm, fitness, crossover, mutation, termination criteria, optimization of a mathematic function, why genetic algorithms work, Introduction to Machine Learning:

TEXT BOOKS

- 1: Michael Negnevitsky; Artificial Intelligence: A guide to intelligent systems ; Addison-Wesley
- 2: Ben coppin; Artificial intelligence illuminated; jones and Bartlett publishers
- 3: Elaine Rich & Kevin Knight: " Artificial Intelligence" M/H 1983

References:

1. " A Guide to Expert System" Waterman, D.A., Addison,- Wesley inc. 1986.
2. "Building expert system" Hayes, Roth, Waterman, D.A (ed), AW 1983.
3. Stuart Russell and Peter Norvig; Artificial intelligence a modern approach; prentice hall series
4. George J. Klir/ Bo Yuan; fuzzy sets and fuzzy logic; PHI
5. Neural Networks Methodology and applications; Gerard Dreyfus; springer
6. Mitayi Gen and Runwei Cheng; Genetic algorithms and engineering optimisation; John Wiley & sons, inc



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| Course Title | Mechatronics | | | | | B. Tech. ME VIII Sem | | |
|---|--|------------|---|----|------------------------------------|--|------------------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803809 | OEC | L | T | P | C | Continuo us Internal Assessme nt | End Exa ms | Total |
| | | 3 | 0 | -- | 3 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| <p>Course Objective: To study about various, sensors, transducers, microprocessors and</p> <ol style="list-style-type: none"> 1. To study the Actuators and drive systems, used in mechanical engineering 2. To study how motion controls can be used to do simple applications in mechanical engineering 3. To study about Architecture of intelligent machines and sensors its applications | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | At the of the course student can learn about various Actuators and drive systems | | | | | | | |
| CO 2 | .Knowledge fuzzy logic | | | | | | | |
| CO 3 | Student learn Various Analog and Digital Sensors | | | | | | | |

Unit – I Introduction: Definition of Mechatronic products, design considerations and tradeoffs, Overview of Mechtronic products. Intelligent machine Vs Automatic machine economic and social justification, **Actuators and drive systems:** Mechanical, Electrical, hydraulic drive systems, Characteristics of mechanical, Electrical, Hydraulic and pneumatic actuators and their limitations.

Unit – II Motion Control: Control parameters and system objectives, Mechanical Configurations, Motion Control algorithms: Significance of feed forward control loops, shortfalls, fundamentals concepts of adaptive and fuzzy – control. Fuzzy logic compensatory control of transformation and deformation non- linearity”s

Unit –III Architecture of intelligent machines: Introduction to Microprocessor and

programmable logic controls and identification of systems. System design classification, motion control aspects in design, **Manufacturing data bases:** Data base management system, CAD/CAM data bases, graphic data base, introduction to object oriented concepts, objects oriented model language interface.

Unit – IV Sensor interfacing: Analog and digital sensors for motion measurement, digital transducers, human-Machine and machine- Machine inter facing devices and strategy.

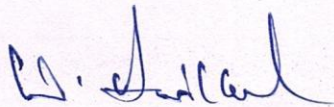
Unit – V Machine vision: Feature and pattern recognition methods, concepts of perception and cognition in decision-making.

Text books:

1. "Designing intelligent machines", open university, London. Michel B. Histan and david G. Alciatore.
2. Introduction to Mechatronics and Measurement systems, Tata Mc Graw Hill.
3. C.W. desilva, "Control sensors and actuators, Prentice Hall.

REFERENCE BOOKS/VIDEO:

1. Devdas Shetty & Richard Kolk "Mechatronics System Design", 3rd edition. PWS Publishing, 2009.
2. http://video_demos.colostate.edu/mechatronics
3. [http:// mechatronics.me.wisc.edu](http://mechatronics.me.wisc.edu)



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| Course Title | Industrial Safety | | | | | B. Tech. ME | | |
|--|--|------------|---|----|--------------------------------|--------------------------------|-----------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803912 | OEC | L | T | P | C | Continuous Internal Assessment | End Exams | Total |
| | | 2 | 0 | -- | | | | |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objective: <ul style="list-style-type: none"> To provide exposure to the students about safety and health provisions related to hazardous processes as laid out in Factories act 1948. To familiarize students with powers of inspectorate of factories. To help students to learn about Environment act 1986 and rules framed under the act. <p>To provide wide exposure to the students about various legislations applicable to an industrial unit</p> | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | • To list out requirements mentioned in factories act for the prevention of accidents | | | | | | | |
| CO 2 | • To understand the health and welfare provisions given in factories act. | | | | | | | |
| CO 3 | • To understand the statutory requirements for an Industry on registration, license and its renewal. | | | | | | | |

UNIT I

FACTORIES ACT – 1948 10 Statutory authorities – inspecting staff, health, safety, provisions relating to hazardous processes, welfare, working hours, employment of young persons – special provisions – penalties and procedures-

UNIT II

ENVIRONMENT ACT – 1986 10 General powers of the central government, prevention, control and abatement of environmental pollution-Biomedical waste (Management and handling Rules, 1989-The noise pollution (Regulation and control) Rules, 2000-The Batteries (Management and Handling Rules) 2001- No Objection certificate from statutory authorities like pollution control board. Air Act 1981 and Water Act 1974, Central and state boards for the prevention and control of air pollution.

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UNIT III

MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES 1989 10 Definitions – duties of authorities – responsibilities of occupier – notification of major accidents – information to be furnished – preparation of offsite and onsite plans – list of hazardous and toxic chemicals – safety reports – safety data sheets.

UNIT IV

OTHER ACTS AND RULES 20 Indian Boiler Act 1923, static and mobile pressure vessel rules (SMPV), motor vehicle rules, mines act 1952, workman compensation act, rules – electricity act and rules – hazardous wastes (management and handling) rules, 1989, with amendments in 2000- the building and other construction workers act 1996., Petroleum rules, Gas cylinder rules-Explosives Act 1983-Pesticides Act

UNIT V INTERNATIONAL ACTS AND STANDARDS 10 Occupational Safety and Health act of USA (The Williams - Steiger Act of 1970) – Health and safety work act (HASAWA 1974, UK) – OSHAS 18000 – ISO 14000 – American National Standards Institute (ANSI).

Text books: 1. Industrial safety management By LM Deshmukh.-MGH

4. Industrial safety and maintenance management by M.P.Poonia&S.C.Sharma. Khanna book publishing pvt ltd..

5. Industrial safety, health environment and security; By Basudev pandā. Lakshmi publications.

REFERENCES

1. The Factories Act 1948, Madras Book Agency, Chennai, 2000

2. The Environment Act (Protection) 1986, Commercial Law Publishers (India) Pvt.Ltd., New Delhi.

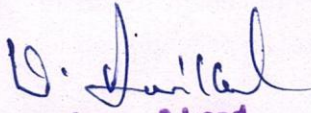
3. Water (Prevention and control of pollution) act 1974, Commercial Law publishers (India) Pvt.Ltd., New Delhi.

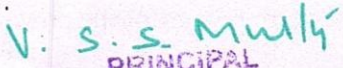
4. Air (Prevention and control of pollution) act 1981, Commercial Law Publishers (India) Pvt.Ltd., New Delhi.

5. The Indian boilers act 1923, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.

6. The Mines Act 1952, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.

7. National seminar on hazardous waste management organized by National Safety council, Ministry of environment and forests, Government of India, United States – Asia environmental partnership, Indian chemical manufacturers association, April 2001.


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| Course Title | VIRTUAL REALITY SYSTEMS | | | | B. Tech. ME | | | |
|---|--|------------|---|----|--------------------------------|--|------------------|-------|
| Course Code | Category | Hours/Week | | | Credits | Maximum Marks | | |
| 1803913 | OEC | L | T | P | C | Continu ous Internal Assess ment | End Exa ms | Total |
| | | 2 | 0 | -- | 2 | 30 | 70 | 100 |
| Mid Exam Duration: 2Hrs | | | | | End Exam Duration: 3Hrs | | | |
| Course Objective: | | | | | | | | |
| <ul style="list-style-type: none"> • Design a virtual environment and compelling virtual reality experience. • Create compelling virtual experiences. • Comprehend and analyze the fundamental issues of virtual reality. • Comprehend the IEEE VR proceedings. | | | | | | | | |
| Course Outcomes: On successful completion of this course, the students will be able to | | | | | | | | |
| CO 1 | Simulate flight | | | | | | | |
| CO 2 | Know Different Hardware and input devices | | | | | | | |
| CO 3 | Know Software technologies and 3d interaction techniques | | | | | | | |
| Co4 | Design 3D interfaces and virtual reality applications | | | | | | | |

UNIT-1 VIRTUAL REALITY AND VIRTUAL ENVIRONMENTS: The historical development of VR: Scientific landmarks Computer Graphics, Real-time computer graphics, Flight simulation, Virtual environments, Requirements for VR, benefits of Virtual reality.

UNIT-2 HARDWARE TECHNOLOGIES FOR 3D USER INTERFACES: Visual Displays Auditory Displays, Haptic Displays, Choosing Output Devices for 3D User Interfaces. 3D USER INTERFACE INPUT HARDWARE: Input device characteristics, Desktop input devices, Tracking Devices, 3D Mice, Special Purpose Input Devices, Direct Human Input, Home - Brewed Input Devices, Choosing Input Devices for 3D Interfaces.

UNIT-3 SOFTWARE TECHNOLOGIES: Database - World Space, World Coordinate, World Environment, Objects - Geometry, Position / Orientation, Hierarchy, Bounding Volume, Scripts and other attributes, VR

Environment - VR Database, Tessellated Data, LODs, Cullers and Occluders, Lights and Cameras, Scripts,
Interaction - Simple, Feedback, Graphical User Interface, Control Panel.

UNIT-4

3D INTERACTION TECHNIQUES: 3D Manipulation tasks, Manipulation Techniques and Input Devices, Interaction Techniques for 3D Manipulation, Design Guidelines - 3D Travel Tasks, Travel Techniques, Design Guidelines - System Control, Classification, Graphical Menus, Voice Commands, Gestural Commands, Tools, Multi modal System Control Techniques.

UNIT-5

DESIGNING AND DEVELOPING 3D USER INTERFACES: Strategies for Designing and Developing Guidelines and Evaluation. **ADVANCES IN 3D USER INTERFACES:** 3D User Interfaces for the Real World, AR Interfaces as 3D Data Browsers, 3D Augmented Reality Interfaces, Augmented Surfaces and Tangible Interfaces, Agents in AR, Transitional AR-VR Interfaces - The future of 3D User Interfaces. **VIRTUAL REALITY APPLICATIONS:** Engineering, Architecture, Education, Medicine, Entertainment, Science, Training.

Text Books: 1. Virtual reality systems By John Vince –Pearson's education.

2. Virtual reality technology and applications –Mihelj & etal.,

3. Burdea, Grigore C and Philippe Coiffet, "Virtual Reality Technology", Wiley Interscience, India, 2003.

REFERENCES:

1. Alan B Craig, William R Sherman and Jeffrey D Will, "Developing Virtual Reality Applications: Foundations of Effective Design", Morgan Kaufmann, 2009.

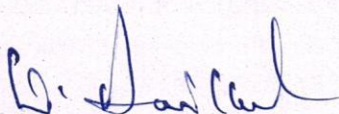
2. Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.

3. Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, "3D User Interfaces, Theory and Practice", Addison Wesley, USA, 2005.

4. Oliver Bimber and Ramesh Raskar, "Spatial Augmented Reality: Merging Real and Virtual Worlds", 2005.

5. Howard Rheingold, "Virtual Reality: The Revolutionary Technology and how it Promises to Transform Society", Simon and Schuster, 1991.

6. William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002.



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DEPARTMENT OF MECHANICAL ENGINEER

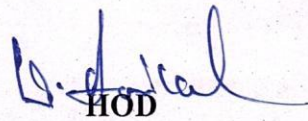
**List of Students opted for MINOR DEGREE/HONORS Degree
in mechanical engineering**

MINOR DEGREE

| S.No | Name of the student | Regd.No | Branch & semester | CGPA upto III sem | Subjects opted |
|------|---------------------|------------|------------------------------|-------------------|---------------------------------|
| 1 | N.Aruna | 189Y1A0234 | EEE branch, Vsemester | 8.26 | 1)METROLOGY 2)Thermodynamics |
| 2 | Navani Kona | 189Y1A0222 | EEE branch, V semester | 8.73 | 1)METROLOGY 2)Thermodynamics |

HONORS Degree

| S.No | Name of the student | Regd.No | Branch & semester | CGPA upto III sem | Subjects opted |
|------|-----------------------|------------|----------------------------|-------------------|---|
| 1 | Siddareddy lingamaiah | 189Y1A0366 | ME branch, VSemister | 8.09 | 1) Renewable Energy Technologies 2)Autotronics |


HOD

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