RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Automobile Engineering, III-Semester

ES-3001 Energy, Environment, Ecology & Society

Unit –I

Energy- Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.

Unit –II

Ecosystem – Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation,

Unit –III

Air Pollution & Sound Pollution -

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain.

Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial.

Unit –IV

Water Pollution– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

Unit –V

Society, Ethics & Human values– Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

References:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI

8. Gerard Kiely, "Environmental Engineering" ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunninghan WP and MA; principles of Environment Sc; TMH
11. Pandey, S.N. & Mishra, S.P. Environment & Ecology, 2011, Ane Books , Pvt. Ltd, New Delhi
12. Joseph, B. Environmental Studies, 2009 Tata Mcgraw Hill, Edu India Ltd. New Delhi.
13. Gour R.R, Sangal, R &Bagaria, G.P. , Excel Books, A-45, Naraina Phase-I ,New Delhi.-110028

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Automobile Engineering, III-Semester

AU/IP/ME-3002 Strength of Materials

Objectives :
To familiarize the students with the fundamentals of deformation, stresses, strains in structural elements.

Outcomes :
At the completion of this course, students should be able to
1. Know the concepts of stress and strain.
2. Analyze the beam of different cross sections for shear force, bending moment, slope and deflection.
3. Understand the concepts necessary to design the structural elements and pressure vessels.

Stress and strain: stresses in members of a structure, axial loading, normal stress, shear stress, analysis of simple structures, stepped rods, members in series and parallel: stress strain diagram, Hooke's law, stress due to temperature, Poisson's ratio, Bulk modulus, shear strain, relation among elastic constants, residual stress, fiber reinforced composite materials, strain energy under axial loads and stresses due to impact of falling weights. Transformation of stress and strain, principal stresses, normal and shear stress, Mohr's circle and its application to two and three dimensional analysis.

Bending: pure bending, symmetric member, deformation and stress, bending of composite sections, eccentric axial loading, shear force and BM diagram, relationship among load, shear and BM, shear stresses in beams, strain energy in bending, deflection of beams, equation of elastic curve, Macaulay's method and Area moment method for deflection of beams.

Torsion in shafts: Tensional stresses in a shafts, deformation in circular shaft, angle of twist, stepped and hollow transmission shafts.

Theories of failures: maximum normal stress & shear stress theory; maximum normal and shear strain energy theory; maximum distortion energy theory; application of theories to different materials and loading conditions.

Columns & struts : stability of structures, Euler's formula for columns with different end conditions, Rankine's formula.

EVALUATION
Evaluation will be continuous an integral part of the class as well through external assessment.

References:
1. Beer FP, Johnson Mechanics of Materials ,Sixth Edition ;Mc Graw Hills
2 Debabrata Nag & Abhijet Chanda :Strength of Materials : Wiley
3 Rattan; Strength of materials;Second Edition , Mc Graw Hills
4. Nash William; Schaum's Outline Series; forth Edition Strength of Materials;Mc Graw Hills

5. Singh Arbind K; Mechanics of Solids; PHI
6. Sadhu Singh; Strength of Materials; Khanna Pub.
7 R Subramannian , Strength of materials OXFORD University Press ,Third Edition .
8 S Ramamurthum , Strength of materials , Dhanpat Rai

List of experiments :

1. Standard tensile test on MS and CI test specimen with the help of UTM
2. Direct/ cross Shear test on MS and CI specimen
3. Transverse bending test on wooden beams to obtain modulus of rupture
4. Fatigue test
5. Brinell Hardness tests
6. Vicker hardness test
7. Izod/Charpy test
8 Rockwell Hardness test

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Automobile Engineering, III-Semester

AU/IP/ME-3003 Theory of Machines & Mechanisms

Objectives :
To expose the students to learn the fundamentals of various laws governing rigid bodies and its motions.

Outcomes : At the completion of this course, students should be able to know

1. Basic mechanisms, velocity and acceleration of simple mechanisms
2. Drawing the profile of cams and its analysis
3. Gear train calculations , Gyroscopes
4. Inertia force analysis and flywheels
5. Balancing of rotating and reciprocating masses

Mechanisms and Machines: Links, Pairs, Chains, Structure, Mechanism, Machine, Equivalent linkage, Degrees of freedom, Gruebler's & Kutzback's criterion, Inversions of four bar chain, Mechanism with lower pairs Pantograph, Straight line motion mechanisms, Davis and Ackermann's steering mechanisms, Hooke's joint, Numerical problems based on above topics..

Motion: Plane motion, Absolute & Relative motion, Displacement, Velocity and Acceleration of a point, Velocity and Acceleration Analysis by Graphical & Analytical methods, Velocity image, Velocity of rubbing, Kennedy's Theorem, Acceleration image, Acceleration polygon, Coriolis acceleration component, Klein's construction, Velocity and Acceleration Analysis using Complex Algebra (Raven's Approach), Numerical problems based on above topics

Gears: Classification of gears, Helical, Spiral, Bevel, Worm and Spur Gear, Spur Gear Terminology, Law of gearing, Tooth profiles, , velocity of sliding, Path of contact, Arc of contact, Contact Ratio, Interference and Undercutting, , Conjugate action, Numerical problems based on above topics

Gear Trains : Simple, compound, reverted and epi cyclic gear trains . Velocity ratio and torque calculation in gear trains

Cams: Classification of Cams and Followers, Radial Cam Terminology, Analysis of Follower motion (uniform, modified uniform, simple harmonic, parabolic, cycloidal), Pressure Angle, Radius of Curvature, Cam Profile for radial and offset followers Synthesis of Cam Profile by Graphical Approach, Cams with Specified Contours.

Gyroscope: Gyroscopic Action in Machines, Angular Velocity and Acceleration, Gyroscopic torque/ couple, Gyroscopic effect on Naval Ships, Stability of Two and Four Wheel Vehicles, Rigid disc at an angle fixed to a rotating shaft.

Belt Rope & Chain Drive : Types of Belts, Velocity ratio of a belt drive, Slip in belts, Length of open belt and crossed belt, Limiting ratio of belt-Tensions, Power transmitted by a belt, Centrifugal tension, Maximum tension in a belt, Condition for maximum power transmitted, Initial tension in a belt, Creep in belt, Applications of V-Belt, Rope and Chain drives.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

Reference :

1. Thomas Bevan; Theory of Machines; Pearson Education
2. Rattan SS; Theory of machines; MC Graw Hills
3. Ambekar AG; Mechanism and Machine Theory; PHI. Eastern Economy Edition 2015
4. Uicker & Shigley, Theory of machines & Mechanism Second Edition Oxford University Press
5. Dr.Jagdish Lal; Theory of Machines; Metropolitan Book Co; Delhi
6. Rao J S and Dukkipati; Mechanism and Machine Theory; New Age Delhi.
7. Abdulla Shariff , Theory of Machines .

List of Experiments:

1 To finds out gyroscopic couple .

2 To Find out velocity & acceleration of slider crank mechanism by Klin"s Construction

3 To find out velocity ratio of various gear trains

4 To study various types of belt drives & find out the velocity ratio of the drive .

5 To Draw the cam profile .

6 Study of working models of various popular mechanisms like quick return mechanism etc .

7 .To draw Involute profile of a gear by generating method .

8.Study of the mechanisms like Pantograph mechanism , Davis & Ackerman's steering mechanisms etc .

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Credit Based Grading System

Automobile Engineering, III-Semester

AU/IP/ME-3004 Manufacturing Process

Objectives :
To make the students aware of different manufacturing processes like casting, metal forming, metal cutting and gear manufacturing.

Outcomes :
1. Concepts of casting Technology.
2. Mechanical working of metals.
3 Concepts of welding process
4 Concept of forging methods
5 Understanding press working .

Casting : Types of casting process **.**Molding and Foundry core sands and their properties, gating, runners, risers, solidification, defects and elimination, molding machines, centrifugal casting, dye casting, shell molding; Lost wax molding; continuous casting; cupola description and operation.
Welding: Types of welding ,Gas welding method, flames, gas cutting, Electric arc welding, AC and DC welding machines and their characteristics, flux, electrodes, submerged arc welding, TIG & MIG welding; pressure welding; electric resistance welding spot, seam and butt welding; Thermit chemical welding; brazing and soldering, welding defects & remedies .safety precautions .
Pattern Making: Types of patters, Pattern and pattern making, pattern allowances; pattern design considerations, core, core boxes .
Forging: types of forging operations Theory and application of forging processes description; , drop and horizontal forging machines .
Press working: Description and operation of processes, process of shearing, punching, piercing, blanking, trimming, perfecting, notching, lancing, embossing, coining, bending, forging and drawing; press, tool dies, auxiliary equipment, safety devices, stock feeders, scrap cutters, forces, pressure and power requirements .
Rolling: Types of Rolling operations ,General description of machines and process; rolling of structural section plates and sheets; hot and cold rolling techniques
Metal Machining : Basics of Lathe machines , operations & components ,working principle of Shaper & planner ,Introduction to milling ,grinding and drilling machines .

List of Experiments :
1. Study of tools used for various manufacturing processes , study includes application & live demonstration of hand and machine tools .
2. Hands on Exercise on Pattern Making
3. Performance on Metal Casting of Simple component
4. Performance on Welding of simple work piece (Example Arc and Resistance Welding)
5. Exercise Problems on Welding
6. Exercise problems on Casting
7. Study of forging machine & demonstration of various operations of forging .

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8. Study of Hydraulic ,Pneumatic presses & demonstration of piercing, slitting, deep drawing operations on press machine .

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

References:

1. Anderson and Tetro; Shop Theory; Mc Graw Hills
2. Kaushish JP; Manufacturing Processes; PHI Learning.
3. Kalpakjian Producting Engineering PEARSON Education
4. Chapman; Workshop Technology
5. Philip F Ostwald ; Manufacturing Process & systems : John Wiley
6. Raghuvanshi; Workshop Technology ; Dhanpat Rai.
7. Hajra Choudhary; Workshop Technology:, Vol I

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Automobile Engineering, III-Semester

AU/IP/ME-3005 Thermodynamics

Objectives : To develop ability and gain insight into the process of problem-solving, with emphasis on thermodynamics .Specially in following manner:
· Apply conservation principles (mass and energy) to evaluate the performance of simple engineering systems and cycles, · Evaluate thermodynamic properties of simple homogeneous substances, · Analyze processes and cycles using the second law of thermodynamics to determine maximum efficiency and performance, · Discuss the physical relevance of the numerical values for the solutions to specific engineering problems and the physical relevance of the problems in general, and · Critically evaluate the validity of the numerical solutions for specific engineering problems.

Outcomes : At the completion of this course, students should be able to
1. find values of thermodynamic properties in tables;
2. draw thermodynamic processes on pressure-temperature, pressure-volume, or temperature-volume diagrams;
3. use compressibility charts;
4. calculate expansion or compression work in a closed system;
5. use conservation of mass to determine the change in mass of a system

Basic Concepts & Laws of Thermodynamics : Basic concepts: Property, Equilibrium, State, Process, Cycle, Zeroth law of thermodynamics, Heat and work transfer. First law of thermodynamics- first law applied to various systems steady flow process, limitations of first law of thermodynamics.
Second law of thermodynamics, heat engine, heat reservoir, Refrigerator, heat pump, Carnot's cycle, statements of second law Reversible and irreversible processes, consequence of second law, Clausious
Inequality , Entropy, T-S diagrams, Available & Unavailable energy Availability Concept .

Properties of Steam : Pure Substance, Phase, Phase-transformations, formation of steam, properties of steam, PVT surface, HS,TS,PV,PH,TV diagram, processes of vapor measurement of dryness fraction, Use of steam tables and Mollier chart.

Air standard cycles: Carnot, Otto, Diesel, Dual cycles and their comparison, Brayton cycle, Non reactive gas mixture, PVT relationship, mixture of ideal gases, properties of mixture of ideal gases, internal energy, Enthalpy and specific heat of gas mixtures.

Fuels & combustion : Actual & theoretical Combustion processes , Enthalpy of formation & enthalpy of reaction, first law analysis of reacting systems, Adiabatic flame temperature , Basic concept of Third Law of thermodynamics .
Steam Tables Mollier Charts & tables connected to reactive systems are allowed in Examination hall .

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

References:

1. P.K.Nag; Engineering Thermodynamics; Mc Graw Hills Fifth Edition
2 Cengel Y; Thermodynamics; MC Graw Hills ,Eight Edition
3 Kross & Potter Thermodynamics for Engineers CENGAGE Learning
4 Moran, Shapiro ,Boettner Principles of Engineering Thermodynamics Wiley student edition
5 P Chattopadhya , Engineering Thermodynamics Second Edition,OXFORD University Press
5 Zemansky Heat & Thermodynamics , Eight Edition , Mc Graw Hills India Education
6. Achuthan M; Engineering Thermodynamics by, PHI India.
7 R Yadav Applied Thermodynamics , Central Publishing house Allahabad

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Automobile Engineering, III-Semester

AU/IP/ME/AT/MI -3006 Computer Programming-I (JAVA)

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. Deitel & Deitel, ”JAVA, How to Program”; PHI, Pearson.
2. E. Balaguruswamy, “Programming In Java”; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
4. Peter Norton, “Peter Norton Guide To Java Programming”, Techmedia.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall

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List of Program to be made (Expandable)

1. Installation of J2SDK
2. Write a program to show Concept of CLASS in JAVA
3. Write a program to show Type Casting in JAVA
4. Write a program to show How Exception Handling is in JAVA
5. Write Programs to show Inheritance and Polimorphism.
6. Write a program to show Interfacing between two classes
7. Write a program to Add a Class to a Package
8. Write a program to demonstrate AWT.
9. Write a Program to show Data Base Connectivity Using JAVA
10. Write a Program to show "HELLO JAVA " in Explorer using Applet
11. Write a Program to show Connectivity using JDBC
12. Write a program to demonstrate multithreading using Java.
13. Write a program to demonstrate applet life cycle.