List of New Course(s) Introduced

Department : ***Mechanical Engineering***

Programme Name : ***B.Tech.***

Academic Year : 2019-20

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	ME03TPE11	Material Science & Metallurgy
02.	ME03TES04	Engineering Thermodynamics
03.	ME03TPC04	Dynamics of Machine

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DEPARTMENT OF MECHANICAL ENGINEERING

SCHOOL OF ENGINEERING & TECHNOLOGY GGV, BILASPUR CG

MINUTES OF MEETING OF BOARD OF STUDIES

A meeting of board of studies of Department of Mechanical Engineering was held on 24/04/2019 from 9:30AM, onwards at Room No.G-25 of New-IT building. Following members were present:-

1. Dr. Rajesh Kuamr Bhushan,
   H.O.D. Department Mechanical Engineering
   (Chairman Board of Studies)

2. Prof. Alok Satapathy
   Professor NIT Rourkela
   (External Subject Expert)

3. Mrs. Shweta Singh
   Assistant Prof. Department of Mechanical Engineering
   (Member Board of Studies)

4. Mr Leeladhar Rajput
   Assistant Professor Department Industrial and Production Engineering
   (Invited Member)

5. Dr. C.P. Dhuri
   Assistant Professor Department of Pure and Applied Mathematics
   (Invited Member)

Mr. Vivek Singh, Executive Engineer (Mech), Damodar Valley Corporation, (Member of B.O.S. as an Industry xpert) could not attend the BOS meeting due to health problem. The syllabus of B.Tech and M.Tech were sent to him through email and he has mailed his suggestions, which were discussed and incorporated as per opinion of other board members.

24.04.19 24/4/19 24/4/19 24/4/19 24/04/19

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Changes in syllabus of B. Tech. 2th year (III &IV Sem) Mechanical Engineering BOS 24-04-2019

The following changes have been incorporated in the course syllabus of B. Tech. 2th Year Mechanical Engineering as per the discussion in BOS meeting held in the department. The complete III and IV semester syllabus along with the evaluation scheme is appended for your reference. Salient aspects of the Meeting e are listed below.

1. The following list of New courses were added in B. Tech 2nd Year
    i. Material Science & Metallurgy
    ii. Engineering Thermodynamics
    iii. Dynamics of Machine

2. Electrical Machine- This subject has removed from 4th semester.

Objectives of the Program

i. To produce competent, creative and imaginative engineers.
ii. To create an intellectual reservoir to meet the growing engineer demands of the nation.
iii. To inculcate in the student concepts and intellectual skills, courage and integrity.
iv. To help the graduates to make their way in the society with proper scientific and technical knowledge in mechanical engineering.
v. To help the graduates in design and analysis of mechanical systems with strong fundamentals and methods of synthesis.

Learning Outcomes

i. Ability to apply knowledge of mechanical engineering fundamentals for solving problems.
ii. Ability to design and develop mechanical components and processes to meet desired needs considering various aspects.
iii. Ability to understand and investigate complex mechanical engineering problems experimentally.
iv. Ability to develop sustainable solutions and understand their impact on society and environment.
v. Ability to function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
vi. Ability to comprehend, design documentation, write effective reports, make effective presentations to the engineering community and society at large.
vii. Ability to apply knowledge of engineering to lead teams and manage projects in multidisciplinary environments.
viii. Ability to engage in independent and life-long learning in the broad context of technological changes and advancements.

In the meeting syllabus and scheme of B.Tech (Mechanical Engineering) from III Semester to IV Semester as per Choice Based Credit System (CBCS), The syllabus and scheme of M.Tech I and II semester (Machine Design) and PhD course work have been discussed in detail. The syllabus and scheme of B.Tech (Mechanical Engineering) III Semester and IV Semester, M.Tech I and II semester (Machine Design), PhD course work are approved by the B.O.S. members, revised syllabus is attached with the minutes.

The B.O.S. meeting was concluded with vote of thanks.

Prof. Alok Satapathy
Professor NIT
Rourkela (External
Subject Expert)

Dr. Rajesh Kumar Bhushan
H.O.D. Department of
Mechanical Engineering
(Chairman Board of Studies)

Mr Leeladhar Rajput
Assistant Professor
Department of Industrial and
Production Engineering
(Invited Member)

Mrs. Shweta Singh
Assistant Prof.
Department of Mechanical
Engineering (Member BOS)

Dr. C.P. Dhuri
Assistant Professor
Department of Pure and
Applied Mathematics
(Invited Member)

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GURU GHASIDAS VISHWAVIDHALAYA, (A CENTRAL UNIVERSITY)
DEPARTMENT OF MECHANICAL ENGINEERING
CBCS-NEW, STUDY & EVALUATION SCHEME
W.E.F. SESSION 2019-2020

Year: B.Tech. 2ND year
SEMESTER- III

SN	Course Code	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	INTERNAL ASSESSMENT	ESE	SUB-TOTAL	
1.	ME03THS02	Elective from Humanity Science HS-02	3	0	-	30	70	100	3
2.	ME03TBS05	Statistical Methods	3	1	-	30	70	100	4
3.	ME03TPC01	Mechanics of Solid-I	3	1	-	30	70	100	4
4.	ME03TPC02	Kinematics of Machine	3	1	-	30	70	100	4
5.	ME03TES04	Engineering Thermodynamics	3	1	-	30	70	100	4
6.	ME03TPE01	Professional Electives-01	3	0	-	30	70	100	3
		Total	**18**	**4**	**-**	**180**	**420**	**600**	**22**
PRACTICALS									
1.	ME03PPC01	Mechanics of Solid-I Lab	-	-	2	30	20	50	1
2.	ME03PPC02	Kinematics of Machine Lab	-	-	2	30	20	50	1
Total			**0**	**0**	**4**	**60**	**40**	**100**	**2**

Total Credits: 24
Total Contact Hour: 26
Total Marks: 700
*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.
L-LECTURE, T-TUTORIAL, P-PRACTICAL, ESE –END SEMESTER EXAMINATION

ME03THS02 Electives from Humanity Science-02	**ME03TPE01 Professional Electives-01**
ME03THS21 Engineering Economics	
ME03THS22 Work study and ergonomics	ME03TPE12 Powder Metallurgy
ME03THS23 Employee Relations	ME03TPE13 Material Management

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DEPARTMENT OF MECHANICAL ENGINEERING
CBCS-NEW, STUDY & EVALUATION SCHEME
W.E.F. SESSION 2019-2020

Year: B.Tech. 2ND year
SEMESTER- IV

SN	Course Code	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	INTERNAL ASSESSMENT	ESE	SUB-TOTAL	
1.	ME04THS03	Elective from Humanity Science HS-03	3	0	-	30	70	100	3
2.	ME04TBS06	Numerical Analysis & Computer Programming	3	1	-	30	70	100	4
3.	ME04TPC03	Fluid Mechanics	3	1	-	30	70	100	4
4.	ME04TPC04	Dynamics of Machine	3	1	-	30	70	100	4
5.	ME04TPC05	Machine Drawing	3	0	-	30	70	100	3
6.	ME04TPC06	Manufacturing Science-I	3	0	-	30	70	100	3
		Total	**18**	**3**	-	**180**	**420**	**600**	**21**
PRACTICALS									
1.	ME04PPC03	Fluid Mechanics Lab	-	-	2	30	20	50	1
2.	ME04PPC04	Dynamics of Machine Lab	-	-	2	30	20	50	1
Total			**0**	**0**	**4**	**60**	**40**	**100**	**2**

Total Credits: 23
Total Contact Hour: 25
Total Marks: 700
*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.
L-LECTURE, T-TUTORIAL, P-PRACTICAL, ESE –END SEMESTER EXAMINATION

ME04THS03 Electives from Humanity Science-03
ME04THS31 Business Communication and Presentation Skill
ME04THS32 Renewable energy system and management
ME04THS33 Energy and environment management

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(ME03TES04) ENGINEERING THERMODYNAMICS

Course Objectives:

- To provide a mature approach to the basic principle of classical thermodynamics and to apply it to system surroundings interactions involving work and heat transfer with associated property changes.
- To Use classical thermodynamics principles to develop algebraic relationships among key physical parameters and variable based on analysis of a specified system
- Use references that provide tabulated physical data that are useful to mechanical engineers.
- Familiarity with construction and performance parameters of Boilers

Course outcomes:

- Apply knowledge of classical thermodynamics for formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of thermal sciences in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering
- in particular.
  Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skilfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.
- To continue the study of the applied thermodynamics.

Unit–I

First Law of Thermodynamics

First Law of thermodynamics, Closed system, work done, change in Internal energy, heat transferred during various thermodynamic processes, P-V diagrams. Open system, Thermodynamic analysis of control volume, Conservation of energy principle, the steady flow process applied to (i) Nozzles and Diffuser (ii) Turbines and Compressor, (iii) Throttle valve. Unsteady flow process (Simple system like Charging & Discharging of tanks)

Unit-II

Second Law of Thermodynamics

Second law of Thermodynamics, Introduction (Law of degradation of Energy) Thermal Energy reservoir, Kelvin-Plank &Clausius Statement, Heat engine, Refrigerator and Heat pump, Reversible and Irreversibleprocesses, Carnot cycle, Thermodynamic temperature scale. Entropy: The Clausius Inequality, Entropy, Principle of increaseof entropy, Change in entropy for Closed and steady flow open systems.Second law analysis of engineering system, availability, reversible work and irreversibility.

Unit–III

Vapour power cycles

Property of steam , P-V chart , T-S chart , H-S chart and application of these chart Carnot and Rankine cycles; Reheating and regenerative feed heating Rankinecycles;Binary vapour cycle; Thermal efficiency and work ratios; Factors affecting efficiency and work output. Condenser, classification, vacuum efficiency, cooling towers, types and application.

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Unit-IV

Thermodynamic (PVT) relations of Working Fluids Equation of state for ideal gas; Behaviour of real gasesand compressibility factor; Generalized, empirical and theoretical equations of statefor real gases; Law of corresponding states and use of generalized compressibility chart; Helmoltz and Gibbs functions; Maxwell's relations; Enthalpy, entropy, internal energy, and specific heat relations; Clausius-Clapeyron's equation; Applications to ideal and real gases Joule-thomson coefficient.

Unit-IV

Gas power Cycles

The Carnot cycle, Atkinson cycle, Ericsson cycle, Brayton Cycle, Air standard cycles- Otto cycle, Diesel Cycle and Dual cycle, comparison among cycles.

Text Books:

1. Nag, P.K.," Engineering Thermodynamics", Tata McGraw Hill, New Delhi
2. Thermal Engg. By C.P.Arora Tata McGraw –Hill, New Delhi
3. Engg.Thermodynamic& Approach, Cengel& Boles, TMH
4. Engg. Thermodynamic, John Hawkins
5. Reyner Joel; Engineering Thermodynamics, 5th Ed; Addison Wesley, 1999

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(ME03TPE11) MATERIAL SCIENCE & METALLURGY

Course Objectives:

- To understand various mechanical properties of materials.
- To understand how and why the properties of materials are controlled by its structure at the microscopic and macroscopic levels.
- To understand how and why the structure and composition of a material may be controlled by processing.
- To understand the inter-relationship between composition, structure and properties of engineering materials.
- Get knowledge about different materials, their properties and application.

Course outcomes:

- Acquire knowledge and hands-on competence in applying the concepts of material science in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering .
- Identify, analysis, and solve mechanical engineering problems useful to the society.

Unit-I

Introduction: Classification of engineering Materials, metals, non-metals, plastics, ceramics and composites. Crystalline structure of solids: concepts of unit cell and space lattice, miller indices, crystal structure determination by X-ray diffraction. Crystal structure of ferrous and non-ferrous metals, crystal imperfections.

Plastic Deformation: Mechanisms of plastic deformation, role of dislocation, slip and twinning, slip mechanism, strain hardening.

Unit-II

Phase Diagrams, Phases, phase rules, concept of equilibrium, Phase diagram, lever rule, eutectic, eutectoid, peristaltic and peritectoid systems, iron–carbon diagram, and simplified IC diagram. Heat TreatmentIsothermalTransformationof austenite (TTT diagram), Transformations of austenite upon continuous cooling, annealing, normalizing, hardening, tempering, hardenability of steel, Surface hardening, tempering, case hardening, Jominy test forhardenability, recovery, recrystallization and grain growth, Age hardening.

Unit-III

Corrosion: Principles of corrosion forms of corrosion, factors affecting the rate of corrosion. Corrosive agents and protection against corrosion.

Creep: Introduction to creep mechanism, creep curves, creep resistant materials, introduction to fatigue, cold working of metals and hot working.

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(ME03TPC04) DYNAMICS OF MACHINES

Course Objective:

- To understand the principles of gyroscope and governors.
- To determine the balancing of masses of rotating and reciprocating machine elements
- To analyze the static and dynamic forces for mechanical systems.
- To understand the basics of vibrations.

Course Outcomes:

- Ability to apply the concept of gyroscopic effects and stabilization on various transport vehicles,aero plane & ships etc
- Understand the concept and applications of various governors.
- Ability to apply the principles of balancing of masses to various links, mechanisms and engines.
- 4. Ability to study the various principles of vibrations systems.Course Objectives:

UNIT – I

Gyroscope: Gyroscopic forces and couple(Torque), Angular velocity and acceleration of gyroscope, gyroscopic effect on naval ships, gyroscopic effect on airplane and vehicle moving on curved path.

UNIT – II

Inertia force analysis: Effective force and inertia force of a link, D-Alembert's principle and dynamic equilibrium, equivalent offset inertia force, Dynamically equivalent system, velocity and acceleration of piston, inertia forces in reciprocating engine, engine force analysis, inertia of connecting rod, Flywheels, turning moment diagram for single and multi-cylinder I.C. Engine, Co-efficient of fluctuation of speed, Co-efficient of fluctuation of energy.

UNIT – III

Balancing: Static and dynamic balancing, balancing of rotating masses and balancing of reciprocating masses, balancing of locomotives, effect of partial balancing in locomotive balancing of I.C. Engine, balancing of IN-line engine, balancing of V-engine, balancing of radial engine, forward and reverse crank method, balancing of rotors.

UNIT – IV

Governors: Types of governor, centrifugal governor, spring controlled governor, Watt, Porter and Proell, Hartnell, Hartung governor, governor effect, Power stability, Inertia effects.Governor Performance paremeters.

UNIT – V

Introduction to Vibration: One dimensional longitudinal, transverse, and torsional vibrations, natural frequency, effect of damping on vibrations, types of damping, different types of damping. Forced vibration, forces and displacement, transmissibility, vibration isolation, vibration sensors: seismometer and accelerometers Whirling of shafts with single rotor.

Text Books:

1. S.S.Ratan, Theory of machine, TMH.
2. J.E.Shingley, Theory of machines, McGraw Hill

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