List of New Course(s) Introduced

Department *Mechanical Engineering*

Programme Name : *B.Tech.*

Academic Year : 2018-19

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	ME7TPC15	Power Plant Engineering
02.	ME7TPC17	CAD-CAM
03.	ME7TPE43	Theory of Vibration
04.	ME8TPC19	Turbo Machinery

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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 26/02/2018 from 11:00AM, 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. Mr. Vivek Singh,
   Executive Engineer, (Mech), Damodar Valley Corporation,
   Koderma Thermal Power Station, Jharkhand
   (Member of B.O.S. as an Industry Expert)

3. Prof. Mukesh Kumar Singh
   Department Industrial and Production Engineering
   (Invited Member)

4. Mr. Prashant Kumar Jangde
   Assistant Prof. Department of Mechanical Engineering
   (Member Board of Studies)

5. Mr C P Dewangan, Associate Professor
   Department Industrial and Production Engineering
   (Invited Member)

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

Department of Mechanical Engineering, School of Engineering & Technology, GGV, Bilaspur (C.G.)

Changes in syllabus of B.Tech 4th Year (VII & VIII Sem) Mechanical Engineering BOS 26-02-18

The following changes have been incorporated in the course syllabus of B.Tech 4th Year Mechanical Engineering as per the discussion in BOS meeting held in the department.. List of new courses added in VII and VIII semester are listed below:

1. Power Plant Engineering
2. Turbo Machinery
3. Theory of Vibration
4. CAD-CAM

Additionally total subjects credits in VII semester has been increased from 16 to 18 credits.

Prof. N.D. Mittal, Professor (Mechanical Engineering Department), Maulana Azad National Institute of Technology, Bhopal (M.P.), (External Expert Member) could not attend the BOS meeting due to health problem. However he has mailed his suggestions, which were discussed and incorporated as per opinion of other board members.

In the meeting syllabus and scheme of B.Tech (Mechanical Engineering) from VII Semester to VIII Semester have been discussed in detail as per Choice Based Credit System (CBCS). The syllabus and scheme of B.Tech (Mechanical Engineering) VIIth Semester and VIIIth Semester have been 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.

26.02.18
Mr. Vivek Singh,Executive Engineer, (Mech), Damodar Valley Corporation, (Member of B.O.S. as an Industry xpert) Koderma Thermal Power Station, Jharkhand

26/02/18
Dr. Rajesh Kuamr Bhushan, H.O.D. Department of Mechanical Engineering (Chairman Board of Studies)

26.02.18
Mr Leeladhar Rajput Department of Industrial and Production Engineering (Invited Member)

26/2/18
Mr. Prashant Kumar Jangde Assistant Prof. Department of Mechanical Engineering (Member Board of Studies)

26/2/18
Prof. M.K. Singh, Professor (Department of IPE) (Invited Member)

26.2.18
Mr C P Dewangan, Associate Professor Department Industrial and Production Engineering (Invited Member)

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Department of Mechanical Engineering, School of Engineering & Technology, GGV, Bilaspur (C.G.)

INSTITUTE OF TECHNOLOGY, (SCHOOL OF ENGINEERING &TECHNOLOGY)
GURU GHASIDAS VISHWAVIDHALAYA, (A CENTRAL UNIVERSITY)
DEPARTMENT OF MECHANICAL ENGINEERING
CBCS, STUDY & EVALUATION SCHEME
W.E.F. SESSION 2018-2019

Year: B.Tech. IV year

SEMESTER- VII

S. No.	Course No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	INTERNAL ASSESSMENT	ESE	SUB-TOTAL	
1.	ME7TPC15	Power Plant Engineering	3	1	0	40	60	100	4
2.	ME7TPC16	Refrigeration & Air Conditioning	3	1	0	40	60	100	4
3.	ME7TPC17	CAD-CAM	3	1	0	40	60	100	4
4.	ME7TPE04	Professional Elective-PE04	3	0	0	40	60	100	3
5.	ME7TOE03	Open Elective-OE03	3	0	0	40	60	100	3
		Total	15	03	0	200	300	500	18
		PRACTICALS							
1.	ME7LPC16	Refrigeration & Air Conditioning Lab	-	-	3	30	20	50	2
3.	ME7LMP01	Minor Project	-	-	4	50	-	50	2
4.	ME7LPS02	Seminar on Summer Training (About 30 Days)**	-	-	3	50	-	50	2
		Total			10	130	20	150	6

** 30 days summer training after the end semester examination of VI semester and students are required to submit certificate, detailed training report &make presentation during the seventh semester.

Total Credits: 24, Total Contact Hour: 28, Total Marks: 650

*INTERNAL ASSESSMENT-(MSE- Mid Semester Examination of 20 Marks, one Class Test of 10 marks. Assignment/Quizzes/Group Discussion etc. of 10 marks

L-LECTURE, T-TUTORIAL, P-PRACTICAL,CT-CLASS TEST, E.S.E –END SEMESTER EXAMINATION.

Professional Elective –PE4	Open Elective-OE03
ME7TPE04	**ME7TOE03**
ME7TPE41 Analysis and Synthesis of Mechanism	**ME7TOE31**Principle of Management
ME7TPE42 Gas Dynamics and Jet propulsion	**ME7TOE32** Optimization in Engineering Design
ME7TPE43 Theory of Vibration	**ME7TOE33** Microprocessors in Automation
ME7TPE44 Production Planning & Control	

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DEPARTMENT OF MECHANICAL ENGINEERING
CBCS STUDY & EVALUATION SCHEME
W.E.F. SESSION 2018-2019

Year: B.Tech. IV year
SEMESTER- VIII

S. No.	Course No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	INTERNAL ASSESSMENT	ESE	SUB-TOTAL	
1.	ME8TPC18	Auto Mobile Engineering	3	0	0	40	60	100	3
2.	ME8TPC19	Turbo Machinery	3	1	0	40	60	100	4
3.	ME8TPE05	Professional Elective-PE05	3	0	0	40	60	100	3
4.	ME8TOE04	Open Elective-04	3	0	0	40	60	100	3
Total			12	1	0	160	240	400	13
PRACTICALS									
4.	ME8LMP02	Major Project	-	-	12	120	80	200	10
Total					12	120	80	200	10

Total Credits: 23, Total Contact Hour: 25, Total Marks: 600

INTERNAL ASSESSMENT- (MSE- Mid Semester Examination of 20 Marks, one Class Test of 10 marks. Assignment /Quizzes/Group Discussion etc. of 10 marks.
L-LECTURE, T-TUTORIAL, P-PRACTICAL, CT-CLASS TEST, E.S.E – END SEMESTER EXAMINATION

Professional Elective –PE5	Open Elective –OE4
ME8TPE05	**ME8TOE04**
ME8TPE51 Total Quality Management	**ME8TOE41** Supply Chain Management
ME8TPE52 Cryogenic Engineering	**ME8TOE42** Operation Research
ME8TPE53 Robotics and Robot Applications	**ME8TOE43** Maintenance Management
ME8TPE54 Finite Element Analysis	**ME8TOE44** Intellectual Property Rights

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ME7TPE44 Production Planning & Control	

ME7TPC15 POWER PLANT ENGINEERING

Course Objectives

- To impart knowledge on sources of energy and types of power plants
- To understand construction and working of Steam Power Plants, Hydro Electric power station, diesel powe station, and Nuclear Power Station.
- To impart knowledge about various performance characteristics and its analysis
- To impart knowledge about variable load problem
- To impart knowledge about terms and factors associated with power plant economics

Course Outcomes

- Demonstrate a basic understanding of various types of power plants.
- Acquire knowledge and hands-on competence in the design and development of mechanical systems associated with power plants.
- Compare different energy resources and choose the most appropriate based on local conditions
- Perform simple techno-economical assessments of energy resources
- Design power plant that meet specific energy demands, that are economically feasible and have a minimal impact on the environment

UNIT-I

Coal based thermal power plants, basic Rankine cycle and its modifications, layout of modern coal power plant, super critical boilers, FBC boilers, turbines, condensers, steam andheating rates, subsystems of thermal power plants, fuel and ash handling, draught system, feed water treatment, binary cycles and cogeneration systems

UNIT-II

Gas turbine and combined cycle power plants, Brayton cycle analysis and optimization, components of gas turbine power plants, combined cycle power plants, Integrated Gasifier based Combined Cycle (IGCC) systems.

UNIT-III

Basics of nuclear energy conversion, Layout and subsystems of nuclear power plants, Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANDU Reactor, Pressurized Heavy Water Reactor (PHWR), Fast Breeder Reactors (FBR), gas cooled and liquid metal cooled reactors, safety measures for nuclear power plants.

UNIT-IV

Hydroelectric power plants, classification, typical layout and components, principles of wind, tidal, solar PV and solar thermal, geothermal, biogas and fuel cell power systems

UNIT-V

Energy, economic and environmental issues, power tariffs, load distribution parameters, load curve, capital and operating cost of different power plants, pollution control technologies including waste disposal options for coal and nuclear plants.

Text Books:

1. Nag P.K., Power Plant Engineering, 3rd ed., Tata McGraw Hill, 2008.
2. El Wakil M.M., Power Plant Technology, Tata McGraw Hill, 2010.

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Refrigerants: classification, properties & selection of refrigerants.

UNIT – IV

Refrigeration system components: water and air cooled condensers, evaporative condensers expansion devices capillary tube constant pressure expansion valve thermostatic expansion valve float valve and solenoid valve evaporators, natural convection coils flooded evapoartors direct expansion coils. Reciprocating compressors single stage and multistage compressors work done optimum pressure ratio effect of intercooling volumetric efficiency, effect of clearance isothermal and adiabatic efficiency Rotodynamic compressors screw and vane type compressors principle of operation hermetic semi hermetic and open type refrigeration compressors.

UNIT V

Principles of air conditioning: Psychrometry and psychrometric chart, human comfort, effective temperature comfort chart. Applied psychrometry sensible heat factor psychrometric process problems. Winter air conditioning heating load calculations humidifiers and humidistat. Summer air conditioning cooling load calculations year round air conditioning unitary and central systems principles of air distributions design of air duct systems.

Text Books:

1.Refrigeration and Air Conditioning C. P. Arora - TMH.
2.Refrigeration and Air Conditioning – Manohar Prasad – New-Age International Pub
3. Refrigeration and Air Conditioning – Arora&Domkundwar – DhanpatRai& Sons
4. Refrigeration and Air Conditioning – P.L. Ballaney – Khanna Pub
5. Stoecker W.F. and Jones J.W., Refrigeration and air conditioning, McGraw Hill.
6. Jordan and Prister, Refrigeration and air conditioning, Prentice Hall of India

ME7TPC17COMPUTER AIDED DESIGN & MANUFACTURING (CAD/CAM)

Course Objectives

- To introduce the student to CAD/CAM terminology & its capabilities.
- To become familiar with CAD/CAM software, Graphical user interface & basic tools.
- To recognize geometric and graphical elements of engineering design problems
- To apply a "hands-on" understanding of the basic concepts of computer-aided manufacturing and prototyping through group and individual projects
- Integrate the CAD system and the CAM system by using the CAD system for modeling design information and converting the CAD model into a CAM model for modeling the manufacturing information.

Course Outcomes

- Understand the various CAD/CAM and CNC processes.
- Generate and verify the tool path and NC programs for milling and drilling manufacturing processes.
- Recognize various types of Curves, surface and Solid and their application as used in geometric modeling.
- Write and prove sample part programs for CNC machining
- Plan and execute the production activity control, which actually deals with operations in the shop floor.

UNIT-I

Basics of CAD:Basics fundamental of Computer Graphics, Principle of computer graphics, Product life cycle, Concept of Computer Aided Design (CAD) and architecture, Hardware and software, Color management,

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Raster graphics, Graphics standard, Graphic primitives, lines, andCircle Drawing algorithms, Software documentations, CAD standards GKS, OpenGL, Data exchange standards- IGES, STEP, CALS etc, Communication standards.Standards for vexchange images.

UNIT- II

Geometric Modeling of Curves, Surface and Solid: Basics representation of curves, Parametric and non-parametric curves, Mathematical representation of curves, Hermitecurves, Bezier curves,B-spline curves and rational curves.

Basic of Surface, Techniques of surface modelling, Plane surface, Rule surface, Surface of revolution and sweep, Coons and bi-cubic patches, concept of Bezier and B-spline surfaces, Basic concept of solid modelling technique, CSG and B-rep method for solid generation.

UNIT – III

Geometric Transformation: Computer Aided Design (CAD) methodology, Coordinate systems, Theory and applications, 2D and 3D geometric transformation, Homogeneous transformation, Concatenation, Assembly modelling, interferences of positions and orientation, tolerance analysis, mass property calculations,Visual realism- hidden line-surface-solid removal algorithms, shading, colouring, computer animation,Concurrent Engineering

UNIT – IV

Basics of CAM: Basic concept of numerical control (NC) System, NC coordinate system, NC motion control, Application of NC, concepts of computer numeric control(CNC) system, problems with conventional, NC, CNC.

Part Programming: Introduction to NC part programming, manual part programming, Computer assisted part programming, Automatically Programming Tool (APT) language, statements and code of APT, programming methods, advantages of CAD/CAM programming.

UNIT- V

Advance Manufacturing System:Concept of distributed numeric control (DNC) system, and its advantages and disadvantages of over NCand CNC, Concept of computer integrated method (CIM), Flexible manufacturing system(FMS), benefits and applications of CIM and FMS, Group Technology(GT), parts classification and coding systems, benefits and applications of GT, automated storage and retrieval system (AS/RS), Automated guided vehicle(AGV).

Text Books:

1. Principles of Computer Gra[hics, W. M. Neumann and R.F. Sproul, McGraw Hill
2. Computer Graphics, D. Hearn and M.P. Baker, Prentice Hall Inc
3. Production System & Automation, Groover, Prentice Hall, India
4. CAD/CAD Theory & Practice-I.Zeid& R. Sivasubramanium, TMH
5. CAD/CAM. Groover& Zimmer, Prentice Hall, India
6. Computer Graphics & CAD, Ramamurthy, T.M.H.
7. Industrial Robotics & CIM, Surendra Kumar I.B.H.
8. CAD/CAM, P.N.Rao, Prentice Hall, India.
9. CAM T.C. Chang & Wang, Pearson.

Reference Books:

1. Mastering CAD CAM, Ibrahim Zeid, Tata McGraw Hill Publishing Co.
2. CAD/CAM Principles, C. McMohan and J. Browne, Pearson Education

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ME7TPE43 THEORY OF VIBRATION

Course Objectives

- To understand the fundamentals of Vibration
- To be able to mathematically model real-world mechanical vibration problems

Course Outcomes

- Ability to apply Newton's equation of motion and energy methods to model basic vibrating mechanical systems.
- Ability to model reciprocating and oscillatory motions of mechanical systems
- Ability to model undamped and damped mechanical systems
- Ability to model free and forced vibrations
- Ability to model single- and multi-degree of freedom systems
- Ability to analyze of discrete vibrating systems.

UNIT I

Element of vibration system: lumped mass, stiffness and damping, simple harmonic motion, vector representation.

Single degree of freedom system: equation of motion by energy method & Newton law of motion, general solution, free and forced vibration.

UNIT II

Damped and undamped motion- Equation of motion for single and two degree of freedom equivalent damping, logarithmic decrement. Damping measurement, rotating and reciprocating unbalance, vibration absorber, Seismic instruments. Transient vibration: - impulse response, Convolution integral, Fourier analysis.

UNIT III

Multi degree freedom system: Equation of motion, co-ordinate coupling, undamped forced vibration, principal modes, generalized co-ordinates, semi definite system, orthogonality of modes, modal analysis, Lagrange's equation.

UNIT IV

Natural frequency numerical solution: Rayleigh`s method

UNIT V

Continuous system: Vibration of stretched cord, torsional vibration, longitudinal vibration of slender rod, lateral vibration of beams, Shear deformation and rotary inertia effect, Rayleigh`s quotient, Rayleigh`s-Ritz method.

Text Books:

1. Tse.S,Morse R Rolland T . Hinkle. Ivan E. "Mechanical vibrations theory and applications Published by Alllyn and Bacon ,Tne
2. Thomson T. Milliam "theory of vibrations with applications" Prentice Hall of India
3. HartogDen ,J.P. "mechanical vibrations" Tata McGraw Hills, 4th edition 1956)

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ME8TPC19TURBO MACHINERY

Course Objectives

1. The course aims at giving an overview of different types of turbomachinery used for energy transformation, such as steam turbines, gas turbines, compressors. It will focus on applications in power generation, transport, refrigeration.
2. Analyze the performance of turbo machinery.

Course Outcomes

1. Learning of basic principles, governing equations and applications of turbomachines
2. Determine the velocity triangles in turbomachinery stages.
3. Analyze energy transfer through graphical and analytical methods in turbo machines.
4. Able to know the compounding of steam turbine.
5. Able to know the effect of compressibility for flow of air and steam through nozzles/ducts.

UNIT I

Gas dynamics: Isentropic flow, Shock waves, fanno& Raleigh lines, lines converging diverging nozzles flow, adiabatic flow with friction in conducts. Frictionless flow & steady isothermal flow through ducts with heat transfer, design performance of steam nozzle.

UNIT II

General analysis of turbo machines: Turbo machines, compressible flow machines, incompressible flow machine, turbine & compressor stages, radial stages, mixed flow stages, impulse stages, reaction stages multi stage machine, polytropic& isentropic efficiency Euler energy equation, work & efficiency of turbine stages, optimum performance of stage, effect of degree of reaction. Steam turbines-Impulse turbines, velocity diagram, influence of ratio of blade speed & steam speed on blade efficiency in single stage turbine efficiency, impulse blade section, choice of blade angles.

UNIT III

Impulse-reaction turbine: Impulse-Reaction turbines, degree of reaction, height of reaction blading, stages efficiency of impulse-Reaction turbines with half degree of reaction, various losses in steam turbines. State points &reheat factors: State point locus, h-s charts for multi stages turbines, condition curve, reheat factor, internal efficiency. Governing: requirement of steam turbine, Governing, function of governing, nozzles & throttle governing method & their effect on performance, William's line.

UNIT IV

Gas turbine: Principles of Gas turbine, open & closed cycle, Efficiency &work out put, reheat cycle with heat exchanger, regenerative cycle, performance of practical Gas turbine cycle, compressor & turbines efficiency, pressure losses, mechanical losses, performance from design point of view, calculation for simple &practical cycle, polytrophic Efficiency,general performance of simple cycle.

UNIT V

Turbo compressors: Centrifugal & axial flow Compressor, Components comparison, theory &performance of Compressor, multi stage Compression with inter cooling, surging & chocking, H.P. Requirement, Efficiency, blade-angles, surging & stalling, losses and redial equilibrium theory

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Text Books:

1. Principle of Turbo Machinery by D. G. Shepherd –McMillan.
2. Fluid Mechanics by V. L. Streeter – Mc-GrawHill.
3. Gas Turbine Theory & Jet Propulsion – J.K. Jain.
4. Gas Turbine – V. Ganeshan – TMH.
5. Turbine, Compressors and Fans – S.M. Yahya – TMH.
6. Steam and Gas Turbine – R. Yadav by C.P.H. Publication, Allahabad

ME8TPE51 TOTAL QUALITY MANAGEMENT

Course Objectives

- To introduce postgraduate students to the philosophy and principles of Total Quality Management (TQM) in the health area as well as to provide them with the underlying principles and techniques of Total Quality Management (TQM) with emphasis on their application to organizations.
- To introduce the main principles of business and social excellence, to generate knowledge and skills of students to use models and quality management methodology

Course Outcomes

- Evaluate the principles of quality management and to explain how these principles can be applied within quality management systems
- .Identify the key aspects of the quality improvement cycle and to select and use appropriate tools and techniques for controlling, improving and measuring quality.
- Critically appraise the organisational, communication and teamwork requirements for effective quality management
- Critically analyse the strategic issues in quality management, including current issues and developments, and to devise and evaluate quality implementation plans

UNIT I

Basic concepts of Quality: Inspection, definition of quality, quality control cost of quality, Value of quality, Statistical Quality Control, Need and advantages of SQC.

Frequency distribution: Variables & attributes, quality characteristics, Theory of control charts, control chart for variable X & R chart, Control chart for attribution p, np, C, Chart & process capability.

UNIT II

Quality Assurance: Quality assurance Manual, Quality Circle, characteristics of quality circle and the process of operation of quality circle, quality Policy & procedure &objectives.

Acceptances Sampling: Concept of sampling, O-C curve & its construction, Sampling plans, single, doubles & multiple sampling plans.

UNIT III

Contribution of Various Quality Management Gurus:JuranTriology, Deming's 14 Points, P-D-C-A Wheel, Taguchi's philosophy, Design of experiment, old and new Seven QC Tool of Quality, Philip Crosby's zero defect, Quality function deployment

UNIT IV

Introduction to ISO 9000: Various models of ISO 9000, Clauses of 9000, Total Quality Control, Total Quality Management, Tools for TQC & 5's TQM, Kaizen. Seven types of waste, 6 sigma quality, procedure of six sigma, TQM and Six Sigma,Bench marking process.

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