Department of Mechanical Engineering

II B.Tech I Semester Course Structure & Syllabus (ACE-R22 Regulations)

ACE
Engineering College
Ankushapur(V), Ghatkesar(M), Medchal Dist - 501 301
(An Autonomous Institution, Affiliated to JNTUH ,Hyderabad)

Department of Mechanical Engineering
B.Tech. in Mechanical Engineering
COURSE STRUCTURE & SYLLABUS (ACE-R22 Regulations)
Applicable from A.Y. 2022-23 Batch

II Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	EE401ES	Elements of Electrical and Electronics Engineering	3	0	0	3
2.	ME402PC	Kinematics of Machinery	3	0	0	3
3.	ME403PC	Fluid Mechanics & Hydraulic Machines	3	0	0	3
4.	ME404PC	IC Engines & Gas Turbines	3	0	0	3
5.	ME405PC	Instrumentation and Control Systems	3	0	0	3
6.	EE407ES	Elements of Electrical and Electronics Engineering Laboratory	0	0	2	1
7.	ME406PC	Fluid Mechanics & Hydraulic Machines Laboratory	0	0	2	1
8.	ME408PC	Instrumentation and Control Systems Laboratory	0	0	2	1
9.	ME409PC	Real-time Research Project/ Field-Based Project	0	0	4	2
10.	*MC410	Gender Sensitization Lab	0	0	2	0
		Total	**15**	**0**	**12**	**20**

EE401ES ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH. II YEAR II SEMESTER **L T P C**
0 0 2 1

Prerequisite: Matrices and Calculus, Intermediate Physics.

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concepts of diodes & transistors

Course Outcomes: Upon completing this course, the student will be able to

CO1: To analyze and solve electrical circuits using n

etwork laws and theorems.

CO2: To understand and analyze basic Electrical and Magnetic circuits

CO3: To study the working principles of Electrical Machines

CO4: To introduce components of Low Voltage Electrical Installations

CO5: To identify and characterize diodes and various types of transistors

UNIT: I D.C. & A.C. CIRCUITS 10L

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits, Three phase balanced circuits, voltage and current relations in star and delta connections Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries.

UNIT: II DC MACHINES & TRANSFORMERS 10L

Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors
Working principle of Single-phase transformer, equivalent circuit, losses in transformers, efficiency, Three-phase transformer connections.

UNIT: III AC MACHINES 10L

Construction and working principle of Three-phase Induction motor, Torques equations and Speed control of Three-phase induction motor. Construction and working principle of synchronous generators.

UNIT: IV P-N JUNCTION AND ZENER DIODE 10L

Principle of Operation Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Zener diode characteristics and applications. Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT: V BIPOLAR JUNCTION TRANSISTOR (BJT) 10L

Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC configurations.
Field Effect Transistor (FET): Construction, Principle of Operation, Comparison of BJT and FET, Biasing FET.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University,2012

2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education,1st Edition,2017.

3. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications, 3rd Edition,2019(Reprint)

REFERENCE BOOKS:

1. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.

2. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company,2013

3. Network Theory by Sudhakar, Shyam Mohan Palli, TMH, 5th Edition, 2017.

4. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.

5. Millman’s Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e, 2007.

WEB REFERENCES:

1. https://nptel.ac.in/courses/108108076

2. https://nptel.ac.in/courses/108105053

ME402PC KINEMATICS OF MACHINERY

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Basic principles of Mechanics

Course Objectives: The objectives of this course are

- To introduce the concept of machines, mechanisms and related terminologies and the relative motion, velocity, and accelerations of the various elements in a mechanism.
- To make the students become familiar with the most commonly used mechanisms such as four bar/slider crank/double slider crank mechanisms and their inversions.
- To provide an overview of straight-line motion mechanisms, steering mechanisms and Hooke's joint.
- To familiarize higher pairs like cams and principles of cams design.
- To understand the kinematic analysis of gears & gear trains.

Course Outcomes: At the end of the course, students will be able to:

- **CO1:** Understand the various elements in mechanism and the inversions of commonly used mechanisms such as four bar, slider crank and double slider crank mechanisms.
- **CO2:** Draw the velocity and acceleration polygons for a given configuration of a mechanism.
- **CO3:** Understand the conditions for straight line motion mechanisms, steering mechanism and theusage of Hooke's joint.
- **CO4:** Draw the displacement diagrams and cam profile diagram for followers executing differenttypes of motions and various configurations of followers.
- **CO5:** Calculate the number of teeth and velocity ratio required for a given combination of gears.

UNIT – I:

Mechanisms: Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematics pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully and incompletely constrained.

Mechanism and Machines – Mobility of Mechanisms: Grubler's criterion, classification of machines –kinematics chain – inversions of mechanism – inversions of quadric cycle chain, single and double slider crank chains, Mechanical Advantage.

UNIT – II:

Kinematics: Velocity and acceleration – Motion of link in machine – Determination of Velocity and acceleration – Graphical method – Application of relative velocity method.

Plane motion of body: Instantaneous center of rotation- centrodes and axodes – Three centers in line theorem – Graphical determination of instantaneous center, determination of angular velocity of points and links by instantaneous center method. Kliens construction - Coriolis acceleration determination of Coriolis component of acceleration

Analysis of Mechanisms: Analysis of slider crank chain for displacement- velocity and acceleration of slider –Analytical Method.

UNIT – III:

Straight-line motion mechanisms: Exact and approximate copied and generated types – Peaucellier - Hart - Scott Russel – Grasshopper – Watt -Tchebicheff's and Robert Mechanism - Pantographs

Steering gears: Conditions for correct steering – Davis Steering gear, Ackerman's steering gear.

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

UNIT – IV:

Cams: Definitions of cam and followers – their uses – Types of followers and cams – Terminology – Types of follower motion - Uniform velocity, Simple harmonic motion and uniform acceleration and retardation. Cycloidal Motion, Maximum velocity, and maximum acceleration during outward and

return strokes in the above 4 cases.
Analysis of motion of followers: Tangent cam with Roller follower – circular arc cam with straight, concave and convex flanks.

UNIT – V:

Higher pair: Friction wheels and toothed gears – types – law of gearing, condition for constant velocity ratio for transmission of motion – velocity of sliding
Forms of teeth, cycloidal and involutes profiles – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference – expressions for arc of contact and path of contact of Pinion & Gear and Pinion & Rack Arrangements– Introduction to Helical – Bevel and worm gearing
Gear Trains: Introduction – Types – Simple – compound and reverted gear trains – Epicyclic gear train. Methods of finding train value or velocity ratio of Epicyclic gear trains. Selection of gear box - Differential gear for an automobile.

TEXT BOOKS:

1. Rattan, S.S, "Theory of Machines", 4th Edition, Tata McGraw-Hill, 2014.
2. Uicker, J.J., Pennock G.R and Shigley, J.E., "Theory of Machines and Mechanisms", 4 th Edition, Oxford University Press, 2014.

REFERENCE BOOKS:

1. Sadhu Sigh, "Theory of Machines", Third Edition, Pearson Education, 2012.
2. Thomas Bevan, "Theory of Machines", 3rd Edition, CBS Publishers and Distributors, 2005.
3. Robert L. Norton, "Kinematics and Dynamics of Machinery", Tata McGraw-Hill, 2009.
4. Rao. J.S. and Dukkipati. R.V. "Mechanisms and Machine Theory", Wiley-Eastern Ltd., New Delhi, 1992.

ME403PC FLUID MECHANICS & HYDRAULIC MACHINES

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: To enable the student:

- To understand the basic principles of fluid mechanics
- To identify various types of flows
- To understand boundary layer concepts and flow through pipes
- To evaluate the performance of hydraulic turbines
- To understand the functioning and characteristic curves of pumps

Course Outcomes:

- **CO1:** Able to explain the effect of fluid properties on a flow system.
- **CO2:** Able to identify type of fluid flow patterns and describe continuity equation.
- **CO3:** To analyze a variety of practical fluid flow and measuring devices and utilize Fluid Mechanics principles in design.
- **CO4:** To select and analyze an appropriate turbine with reference to given situation in power plants.
- **CO5:** To estimate performance parameters of a given Centrifugal and Reciprocating pump.

UNIT – I:

Fluid statics: Dimensions and units: physical properties of fluids- specific gravity, viscosity, and surface tension - vapour pressure and their influence on fluid motion- atmospheric, gauge and vacuum pressures – measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT – II:

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

Fluid dynamics: Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT – III:

Boundary Layer Concepts: Definition, thicknesses, characteristics along thin plate, laminar and turbulent boundary layers (No derivation) boundary layer in transition, separation of boundary layer, submerged objects – drag and lift.

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: Pitot tube, venturi meter, and orifice meter, Flow nozzle.

UNIT – IV:

Basics of turbo machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

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

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

UNIT – V:

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

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

TEXT BOOKS:

1. Hydraulics, Fluid mechanics and Hydraulic Machinery - MODI and SETH, 21st Edition, standard Book House.
2. Fluid Mechanics and Hydraulic Machines by Er. R. K. Rajput, S. Chand,2019.

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, S.K. Kataria & Sons,2018
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International publishers
3. Hydraulic Machines by T.R.Banga & S.C. Sharma, 7th Edition, Khanna Publishers
4. Fluid Mechanics & Hydraulic Mechanics by R.k Bansal, Laxmi Publicatios, Revised Ninth Edition 2010.
5. Fluid Mechanics: Fundamentals and Applications (4th edition, SIE), McGraw-Hill; Fourth edition (28 May 2019).

ME404PC IC ENGINES & GAS TURBINES

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Pre-requisite: Thermodynamics

Course Objective:

- Explain the Components of IC Engines and systems.
- Analyze the stages of combustion to improve the performance of IC engines with respect to fuel economy and control of emissions in global, environmental and social context.
- Understand and evaluate the performance analysis of the major components and systems of IC engines and their applications.
- Explore to the components and working principles of rotary, reciprocating, dynamic andaxial compressors.
- Understand the significance of gas turbines in real context in power generation.

Course Outcomes: At the end of the course, the student should be able to

- **CO1:** Elaborate the working principles of IC Engine systems and its classification.
- **CO2:** Explore the combustion stages of SI and CI engines, and factors influence for bettercombustion.
- **CO3:** Evaluate the testing and performance parameters of IC engines.
- **CO4:** Explain the function and working principles of rotary, reciprocating, dynamic axialcompressors.
- **CO5:** Understand the working principle of gas turbine and its classification with thermodynamicanalysis.

UNIT – I:

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

UNIT – II:

Normal Combustion and abnormal combustion in SI engines – Importance of flame speed and effectof engine variables – Abnormal combustion, pre-ignition and knocking in SI Engines – Fuel requirements and fuel rating, anti-knock additives – combustion chamber – requirements, types of SI engines.

Four stages of combustion in CI engines – Delay period and its importance – Effect of engine variables – Diesel Knock– Need for air movement, suction, compression, and combustion induced turbulence in Diesel engine – open and divided combustion chambers and fuel injection– Diesel fuel requirements and fuel rating.

UNIT – III:

Testing and Performance: Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet and chart

Classification of compressors – Fans, blowers and compressors – positive displacement and dynamictypes – reciprocating and rotary types.

Reciprocating Compressors: Principle of operation, work required, Isothermal efficiency volumetric efficiency and effect of clearance volume, staged compression, under cooling, saving of work, minimum work condition for staged compression

UNIT – IV:

Rotary Compressor (Positive displacement type): Roots Blower, vane sealed compressor, mechanical details and principle of working – efficiency considerations.

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

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

UNIT – V:

Gas Turbines: Simple Gas Turbine Plant – Ideal Cycle – Closed Cycle and Open Cycle for Gast Turbines, Constant Pressure Cycle, Constant Volume Cycle, Efficiency – Work Ratio and Optimum Pressure Ration for Simple Gas Turbine Cycle. Parameters of Performance, Actual Cycle.

TEXT BOOKS:

1. I.C. Engines, V. Ganesan, 4th Edition, Mc Graw Hill
2. Thermal Engineering, Mahesh M Rathore, Tata Mc Graw Hill, 2010

REFERENCE BOOKS:

1. Applied Thermodynamics for Engineering Technologists, Eastop & McConkey, Pearson
2. Fundamentals of Classical Thermodynamics, Vanwylen G.J., Sonntag R.E., Wiley Eastern
3. Internal Combustion Engines Fundamentals, John B. Heywood, McGraw Hill Ed.

ME405PC INSTRUMENTATION AND CONTROL SYSTEMS

B.Tech. II Year II Sem. **L T P C**

3 0 0 3

Prerequisite: Mathematics-I, Thermodynamics, Basic of Electrical and Electronics Engineering.

Course Objectives:

- To impart the basic knowledge of the functional blocks of measurement systems.
- To provide technical understanding of various Temperature and pressure measuring instruments.
- To expose the students to know the working of various physical variable Level, Flow, Speed and Acceleration measuring instruments.
- To understand the working of various physical and Electrical variables Stress, Humidity,Force, Torque and Power measuring instruments.
- To understand the concept of control system and calculate transfer functions of mechanical and translational systems with different techniques.

Course Outcome: After completion of the course, the student will be able to:

- **CO1:** Know the basic knowledge of the functional blocks of measurement systems.
- **CO2:** Describe the working of various physical variable Temperature and pressure measuring instruments.
- **CO3:** Explain the working of various physical variable Level, flow, Speed and Acceleration measuring instruments.
- **CO4:** Understand the working of various physical and Electrical variables Stress, Humidity, Force,Torque and Power measuring instruments.
- **CO5:** Understand the concept of control system and calculate transfer functions of mechanical andtranslational systems with different techniques.

UNIT – I:

Definition – Basic principles of measurement – Measurement systems, generalized configuration and functional description of measuring instruments – examples. Static and Dynamic performance characteristics– sources of errors, Classification and elimination of errors. Measurement of Displacement: Theory and construction of various transducers to measure displacement – Using Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers; Calibration procedures.

UNIT – II:

Measurement of Temperature: Various Principles of measurement-Classification: Expansion Type: Bimetallic Strip- Liquid in glass Thermometer; Electrical Resistance Type: Thermistor, Thermocouple, RTD; Radiation Pyrometry: Optical Pyrometer; Changes in Chemical Phase: Fusible Indicators and Liquid crystals. Measurement of Pressure: Different principles used-Classification: Manometers,Dead weight pressure gauge Tester (Piston gauge), Bourdon pressure gauges, Bulk moduluspressure gauges, Bellows, Diaphragm gauges. Low pressure measurement – Thermal conductivitygauges, ionization pressure gauges, McLeod pressure gauge.

UNIT – III:

Measurement of Level: Direct methods – Indirect methods – Capacitive, Radioactive, Ultrasonic, Magnetic, Cryogenic Fuel level indicators –Bubbler level indicators.

Flow measurement: Rotameter, magnetic, Ultrasonic, Turbine flowmeter, Hot – wire anemometer,Laser Doppler Anemometer (LDA).

Measurement of Speed: Mechanical Tachometers, Electrical tachometers, Non-contact type Stroboscope; Measurement of Acceleration and Vibration: Different simple instruments – Principles of Seismic instruments – Vibrometer and accelerometer using this principle- Piezo electric accelerometer.

UNIT – IV:

Stress-Strain measurements: Various types of stress and strain measurements –Selection and installation of metallic strain gauges; electrical strain gauge – gauge factor – method of usage of resistance strain gauge for bending, compressive and tensile strains – Temperature compensation techniques, Use of strain gauges for measuring torque, Strain gauge Rosettes.

Measurement of Humidity: Moisture content of gases, Sling Psychrometer, Absorption Psychrometer, Dew point meter. Measurement of Force, Torque and Power- Elastic force meters, load cells, Torsion meters, Dynamometers.

UNIT – V:

Elements of Control Systems: Introduction, Importance – Classification – Open and closed systems- Servomechanisms – Examples with block diagrams – Temperature, speed and position controlsystems- Transfer functions- First and Second order mechanical systems

TEXT BOOKS:

1. Principles of Industrial Instrumentation & Control Systems/Chennakesava R alaavala, - Cengage Learning/1st Edition, 2009.
2. Basic Principles – Measurements (Instrumentation) & Control Systems /S. Bhaskar/ AnuradhaPublications

REFERENCE BOOKS:

1. Measurement Systems: Applications & design, E. O. Doebelin, TMH, Tata Mcgraw Hill/6th Edition, 2017.
2. Instrumentation, Measurement & Analysis, B.C. Nakra & K.K. Choudhary, TMH, 4th Edition,2016.
3. Experimental Methods for Engineers / Holman
4. Mechanical and Industrial Measurements / R. K. Jain/ Khanna Publishers.
5. Mechanical Measurements / Sirohi and Radhakrishna / New Age International, 3rd Edition,2013.
6. Mechanical Measurements-Revision | 6th Edition (English, Paperback, Thomas G. Beckwith, Roy D. Marangoni, John H. Lienhard V), Pearson Education, 2020.

EE407ES ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

B.TECH. II YEAR II SEMESTER

L	T	P	C
0	0	2	1

Prerequisite: Elements of Electrical & Electronics Engineering

Course Objectives:

- To introduce the concepts of electrical circuits and its components
- To import the knowledge of various electrical installations.
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC machines, Transformers and AC machines.
- To introduce the concepts of diodes & transistors

Course Outcomes: Upon completing this course, the student will be able to

- **CO1:** To analyze and solve electrical circuits using network laws and theorems.
- **CO2:** To introduce components of Low Voltage Electrical Installations
- **CO3:** To understand and analyze basic Electrical and Magnetic circuits
- **CO4:** To study the working principles of Electrical Machines
- **CO5:** To identify and characterize diodes and various types of transistors

List of experiments/demonstrations: PART A: ELECTRICAL

1. Verification of KVL and KCL
2. Measurement of Three phase Power in a balanced Three-phase circuit
3. Performance Characteristics of a Separately Excited DC Shunt Motor
4. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
5. Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta star, Star-Star) in a Three Phase Transformer
6. Performance Characteristics of a Three-phase Induction Motor
7. No-Load Characteristics of a Three-phase Alternator

PART B: ELECTRONICS

1. Study and operation of (i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.
2. PN Junction diode characteristics
3. Zener diode characteristics and Zener as voltage Regulator
4. Input & Output characteristics of Transistor in CB / CE configuration
5. Full Wave Rectifier with & without filters
6. Input and Output characteristics of FET in CS configuration

WEB REFERENCES:

1 . http://vlabs.iitkgp.ernet.in/be/#

ME406PC FLUID MECHANICS & HYDRAULIC MACHINES LABORATORY

B.Tech. II Year II Sem. **L T P C**

0 0 2 1

Course Objectives:

- To understand the basic principles of fluid mechanics.
- To identify various types of flows.
- To understand boundary layer concepts and flow through pipes.
- To evaluate the performance of hydraulic turbines.
- To understand the functioning and characteristic curves of pumps.

Course Outcomes:

- **CO1:** Able to explain the effect of fluid properties on a flow system.
- **CO2:** Able to identify type of fluid flow patterns and describe continuity equation and demonstrate boundary layer concepts
- **CO3:** To analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanicsprinciples in design.
- **CO4:** To select and analyze an appropriate turbine with reference to given situation in power plants.
- **CO5:** To estimate performance parameters of a given Centrifugal and Reciprocating pump.

List of Experiments:

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Verification of Bernoulli's Theorems.

Note: Perform any 10 out of the 12 Exercises.

Reference Books:

1. Dictionary of Mechanical Engineering – G.H.F. Nayler, Jaico Publishing House.
2. Fluid Mechanics with Laboratory Manual by BIRESWAR MAJUMDAR, Prentice Hall India Learning Private Limited (1 January 2010).

ME408PC INSTRUMENTATION AND CONTROL SYSTEMS LABORATORY

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

Pre-requisites: Basic principles of Instrumentation and control systems

Course Objectives

- To impart knowledge about the principles and analysis of sensors.
- Discussion of errors and error analysis
- Emphasis on characteristics and response of transducers.
- Understand the functioning of strain gauges for measuring pressure and vibration
- Apply calibration of measuring instruments of flow and speed measurement

Course Outcomes: At the end of the course, the student will be able to

- **CO1:** Characterize and calibrate measuring devices.
- **CO2:** Identify and analyze errors in measurement.
- **CO3:** Analyze measured data using regression analysis.
- **CO4:** Calibration of Pressure Gauges, temperature, LVDT, capacitive transducer, rotameter.
- **CO5:** Student learn Real time interfacing of sensor

List of Experiments:

1. Calibration of Pressure Gauges.
2. Calibration of transducer for temperature measurement.
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge for temperature measurement.
5. Calibration of thermocouple for temperature measurement.
6. Calibration of capacitive transducer for angular displacement.
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
8. Calibration of resistance temperature detector for temperature measurement.
9. Study and calibration of a rotameter for flow measurement.
10. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bedat various loads.
11. Study and calibration of McLeod gauge for low pressure.
12. Measurement and control of Pressure of a process using SCADA system.
13. Measurement and control of level in a tank using capacitive transducer with SCADA.
14. Measurement and control of temperature of a process using resistance temperature detector with SCADA.

Note: Perform any 10 out of the 14 Exercises.

Reference Books:

1. Dictionary of Mechanical Engineering – G.H.F. Nayler, Jaico Publishing House.

*MC410 GENDER SENSITIZATION LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	0

COURSE DESCRIPTION:

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

COURSE OBJECTIVE:

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

COURSE OUTCOME:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men

Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

UNIT – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work. "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.

-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

- Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".
- ESSENTIAL READING: The Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu Akademi, Telangana Government in 2015.

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%