

Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)

SCHEME OF TEACHING AND EXAMINATION B.E. V SEMESTER MECHATRONICS ENGINEERING

| S. No | Board of Study | Sub. Code | SUBJECT | PERIODS PER WEEK | | | SCHEME OF EXAM Theory/Practical | | | TOTAL MARKS | Credit L+(T+P)/2 |
|--------------|------------------|------------|--|------------------|----------|-----------|---------------------------------|------------|------------|-------------|------------------|
| | | | | L | T | P | ESE | CT | TA | | |
| 1. | Mechatronics | 367551(67) | Modern Control Systems | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2. | Mechanical Engg. | 367552(37) | Machine Design I | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 3. | Mechanical Engg. | 367553(37) | Dynamics of Machines | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4. | Mechatronics | 367554(67) | Manufacturing Technology | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5. | Mechatronics | 367555(67) | Fluid Machines and Fluidics | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6. | Mechatronics | 367556(67) | Microcontroller Based System Design | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 7. | Mechatronics | 367561(67) | Machine Design I Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8. | Mechatronics | 367562(67) | Dynamics of Machines Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 9. | Mechatronics | 367563(67) | Microcontroller Based System Design Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 10. | Mechatronics | 367564(67) | Fluid Machines and Fluidics Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 11. | Humanities | 300565(46) | Personality Development | - | - | 2 | - | - | 20 | 20 | 1 |
| 12. | Mechatronics | 367566(67) | ** Practical Training Evaluation / Library | - | - | 2 | - | - | 20 | 20 | 1 |
| Total | | | | 22 | 6 | 12 | 640 | 120 | 240 | 1000 | 34 |

L: Lecture

T: Tutorial

P: Practical

ESE: End Semester Examination

CT: Class Test

TA: Teacher's Assessment

*** Industrial Training of eight weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during B.E. V semester.**

Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|-------------------------------------|---------------------------------|-------------------------------------|--------------------|
| Branch: | Mechatronics Engineering | Semester: | V |
| Subject: | Modern Control Systems | Code: | 367551(67) |
| Total Theory Periods: | 40 | Total Tutorial Periods: | 10 |
| No. of class Tests to be conducted: | 2 (Minimum) | No. of assignments to be submitted: | 2 (Minimum) |
| ESE Duration: | Three Hours | Maximum Marks in ESE: | 80 |
| | | Minimum Marks in ESE: | 28 |

Course Objectives:

- Understand different types of control system
- Understand the analysis in time and frequency domain for various control systems.
- Plotting various useful graphs in time and frequency domain.
- Understand the selection of state models for control systems

Course Outcomes:

- The Students will get basic knowledge of all types of control system.
- To know why time domain is used.
- To students will understand the significance of S- domain.
- The students will understand the concept of state variable techniques.

- UNIT I** Basic Components of control System open loop and closed to system, Mathematical Model of Physical Systems: Differential Equation of Physical system. Transfer function, Block Diagram Algebra, signal flow graphs. Feedback characteristics of control systems. Feedback & Non feedback systems, reduction of parameter variation, control of system Dynamic. Control of the effect of dynamic signal by use of feedback, regeneration feedback.
- UNIT II** **Time domain Analysis of control system** :Design specification and performance Indices. Standard Text signals, Time response of first and second order system, steady state error and error constants, Effect of adding a zero to a system. Stability of control system, Design specification of second order system stability concept, Routh- Hurwitz stability criteria relation stability analysis.
- UNIT III** **Root Loci's Technique and Frequency domain Analysis of control system:** Root loci's concept construction for Root loci, Root contours, system with transportation by Polar Plots, Bode Plots. All pass and minimum phase system.
- UNIT IV** **Stability in Frequency Domain:** Stability analysis, Nquist stability criteria, Assessment of relation stability. Realization of basic compensators, Cascade compensation in time and frequency Domain .Feedback compensation.
- UNIT V** **State Variable Analysis and Design:** Concept of state, state variables and state model. State transitions matrix, state model for linear continuous time systems, Diagonalization, solution of state equation, concept of controllability and observability. Pole placement by state feedback.

TEXT BOOKS

1. Control System Engineering, L. Nagrath and Gopal, New Age International Publications
2. Automatic Control Systems by Dorf& Bishop, Pearson, 11thedn
3. Automatic Control System, B.C. Kuo, PHI

REFERENCE BOOKS

1. Modern Control Engineering, Ogata, Pearson Education
2. Control Systems Engineering Using MATLAB, by SN Sivanandam& SN Deepa, Vikas Publishing House Pvt. Ltd.,
3. Modern Control Engineering, Roychoudhury, PHI
4. Control Engineering – A Comprehensive Foundation, Ramakalyan, Vikas Publishing House Pvt. Ltd.
5. Introduction to Control Engineering, Ajit K. Mandal, New Age International Publications.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Mechanical Engineering/Mechatronics Engineering**

Semester: **V**

Subject: **Machine Design I**

Code: **367552(37)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Four Hours**

Maximum Marks in ESE: **80**

Minimum Marks in ESE: **28**

Note: Design data book by PSG and ISI data sheets are allowed in the examination.

Course Objectives:

- To choose proper materials to different machine elements depending on their physical and mechanical properties.
- To design and analyze basic elements of machine e.g. key, shaft and axle.
- To design and analyze various type of joints for members with axial load
- To design and analyze couplings and clutches for members in torsion
- To design and analyze threaded fastener and power screws
- To design and analyze riveted and welded joint

Course outcomes:

- Apply knowledge of machine design for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts 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, analyze, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

- UNIT I** **General Considerations:** Selection of Materials, Design Stress, Factor of Safety, Stress concentration factor in tension, bending and torsion, theories of failures. Notch sensitivity, design stress for variable and repeated loads, fatigue stress concentration factor, endurance diagrams.
- UNIT II** **Basic Elements Design:** Design of socket-spigot cotter joint, sleeve and cotter joint, design of Knuckle joint.
Keys and Couplings: Types of keys, design of keys, design of splines.
Types of couplings, design of flange and flexible couplings, compression coupling, muff coupling.
- UNIT III** **Shafts and Axles:** Transmission shaft, Design against static load, Design for strength, rigidity and stiffness, design under continuous loading for fatigue.
Clutches: Friction clutches, Friction materials, Torque transmitting capacity, Single & Multiple plate clutch, centrifugal clutches.
- UNIT IV** **Threaded fasteners:** Geometry of thread forms, terminology of screw threads and thread standards, specifications of steel bolts, initial tension, and relation between bolt tension and torque, design of statically loaded tension joints, design of bolted joints due to eccentric loading.
Power Screws: Power screws, Force analysis-square and trapezoidal threads, Collar friction, Stresses in screw, coefficient of friction, efficiency of thread.
- UNIT V** **Riveted Joints:** Types of rivet heads, types of riveted joints, failure of riveted joint, strength of rivet joint, efficiency of riveted joint, design of riveted joint for boiler.
Welded joints: Types of welded joints, stresses in butt and fillet welds, strength of welded joints, location and dimension of weld design, eccentrically loaded joint, welded joint subjected to bending moment, design procedure, fillet welds under varying loads, stress relieving techniques.

TEXT BOOKS:

1. Design of Machine Elements- V.B.Bhandari - TMH, New Delhi
2. Mechanical Engineering Design - Shigley – McGraw Hill, Delhi

REFERENCE BOOKS:

1. Machine Design - Movnin – MIR Publishers, Moscow
2. Machine Design - Fundamental & Application – Gope – PHI, New Delhi
3. Machine Design - Sharma & Agrawal – Katson, New Delhi
4. Principles of Mechanical Design - R. Phelan – McGraw Hill, New Delhi.
5. Machine Design – Sundarajamoorthy & Shanmugum – Anuradha Agencies, Chennai

Name of the Programme: Bachelor of Engineering ::: Duration of the Programme: Four Years

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|-------------------------------------|--|-------------------------------------|--------------------|-----------------------|-----------|
| Branch: | Mechanical Engineering/Mechatronics Engineering | Semester: | V | | |
| Subject: | Dynamics of Machines | Code: | 367553 (37) | | |
| Total Theory Periods: | 40 | Total Tutorial Periods: | 10 | | |
| No. of class Tests to be conducted: | 2 (Minimum) | No. of assignments to be submitted: | 2 (Minimum) | | |
| ESE Duration: | Three Hours | Maximum Marks in ESE: | 80 | Minimum Marks in ESE: | 28 |

Course Objectives:

- To study types of mechanical governors and to analyze its performance parameters
- To Apply the theory of balancing to rotating and reciprocating masses.
- To analyze gyro-effect on moving bodies
- To understand the concepts of mechanical vibration
- To perform inertia force analysis of machine elements
- To draw turning moment diagram of reciprocating engines
- To analyze performance parameters flywheel

Course Outcome

- Apply knowledge of Dynamics of machine for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts Dynamics of machine in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering
- Identify, analyze and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

- UNIT I** **Governors:** Characteristics of centrifugal governors, Gravity controlled governors, Porter and proell. Spring controlled centrifugal governor: Hartung, &Hartnell governor. Performance parameter: Sensitivity, stability, Isochronisms, Governor Effort and power.
- UNIT II** **Balancing:** Balancing of rotating masses, Static and dynamic balancing, Determination of balancing masses in two plane balancing, Balancing of internal combustion engines, Balancing of in-line engines, Firing order, Balancing of V-twin and radial engines, Forward and reverse crank method, Balancing of rotors.
- UNIT III** **Gyroscope:** Gyroscopic forces and couple, gyroscopic effect in Airplanes, Ship motion and Vehicles moving on curved path.
- UNIT IV** **Mechanical Vibrations:** One-dimensional, longitudinal, Transverse, and torsional vibrations, Natural frequency, Effect of damping on vibrations, Different types of damping.Forced vibration, Forces and displacement, Transmissibility, Vibration Isolation, Vibration sensors: seismometer and Accelerometers, Whirling of shafts with single rotor.
- UNIT V** (a) **Inertia force analysis:** Effective force and inertia force on link, Inertia force on reciprocating engine. Inertia force in four bar chain mechanism.
(b)**Turning moment diagram and flywheel:** Turning moment diagram for single and multi cylinder internal combustion engine, Coefficient of fluctuation of speed, Coefficient of fluctuation of energy, Flywheel.

TEXT BOOKS

1. Theory of Machine- S.S.Rattan - Tata McGraw Hill,New Delhi
2. Theory of Machines - Thomas Bevan, - CBS/ Cengage Publishers

REFERENCE BOOKS

1. Theory of Machines and Mechanism– Uicker, Pennock, &Shigley – Oxford Univ. Press
2. Theory of Mechanisms and Machines- A. Ghosh, A. K. Mallik – EWP Press.
3. Mechanism and Machine theory-Ambekar-PHI,Delhi
4. Theory of Machine – P.L. Ballaney – Khanna Publishers, New Delhi
5. Theory of Machine -JagdishLal- Metro Politan Books, New Delhi

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|-------------------------------------|---------------------------------|-------------------------------------|--------------------|
| Branch: | Mechatronics Engineering | Semester: | V |
| Subject: | Manufacturing Technology | Code: | 367554 (67) |
| Total Theory Periods: | 40 | Total Tutorial Periods: | 10 |
| No. of class Tests to be conducted: | 2 (Minimum) | No. of assignments to be submitted: | 2 (Minimum) |
| ESE Duration: | Three Hours | Maximum Marks in ESE: | 80 |
| | | Minimum Marks in ESE: | 28 |

Course Objectives:

- To understand the different types of heat treatment processes
- To study the different manufacturing processes
- To study the different types of machine tools
- To understand the unconventional machining

Course Outcomes:

- The Students will get the knowledge of heat treatment processes
- The students will know about the manufacturing processes.
- The students will become familiar to the machine tools.
- To students will understand the concepts of Unconventional Machining

- UNIT I**
- a) **Ferrous Material:** Allotropy of iron, Fe-C Equilibrium diagram, TTT-diagram, Heat treatment Processes. Plain Carbon steel, Alloy steel cast iron, special purpose steel: High speed steel, stainless steel, Heat resisting steel, free cutting steel, spring steel.
 - b) **Non Ferrous Alloys:** Copper alloys, Aluminum alloys, Mg alloy, Ni base alloy, Lead alloys.
- UNIT II**
- a) **Casting Process:** Green sand mould casting, die casting, Centrifugal casting, investment casting, shell casting.
 - b) **Welding Process:** Shielded metal arc welding, TIG, MIG, atomic hydrogen welding, resistance welding, soldering, brazing, braze welding, Thermit welding.
- UNIT III**
- Mechanical working of Metals**
- Rolling** – Principle, Types of rolling mills, Types of rolled product.
- Forging** – Principle, forgeability, forging processes.
- Extrusion, drawing of wires and tubes.**
- UNIT IV**
- Machine Tools:** Lathe – Types, specifications, operations, capstone and Turret lathe.
Drilling Machine – Types, operations
Shaper, Planer, Slotter – Principle, types of operations,
- UNIT V**
- Unconventional Machining:** Principles and applications of EDM, ECM, EBM, LBM processes
Press working: Principles, press working operations, die assembly, classification of dies, stock strip layout

TEXT BOOKS

- Manufacturing Technology, Metal Cutting and Machine Tool – P.N. Rao, Vol. (I & II) – TMH, New Delhi, 2004
- Production Technology – P.C. Sharma – S. Chand, Delhi, 1999

REFERENCES

1. Manufacturing Engineering & Technology – Kalpakjian S- Pearson Education India, 2001
2. Elements of Workshop Technology, Vol. I & II – HajraChoudhury S.K., HajraChoudhury A.K., Media Promoters and Publishers Private Limited, 1997
3. Materials & Processes in Manufacturing , Paul Degarma E, Black J.T. & Ronald A. Kosher – Prentice Hall of India, 1997

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|-------------------------------------|------------------------------------|-------------------------------------|--------------------|-----------------------|-----------|
| Branch: | Mechatronics Engineering | Semester: | V | | |
| Subject: | Fluid Machines and Fluidics | Code: | 367555 (67) | | |
| Total Theory Periods: | 40 | Total Tutorial Periods: | 10 | | |
| No. of class Tests to be conducted: | 2 (Minimum) | No. of assignments to be submitted: | 2 (Minimum) | | |
| ESE Duration: | Three Hours | Maximum Marks in ESE: | 80 | Minimum Marks in ESE: | 28 |

Course Objectives:

- To understand the principles of jets
- To understand the different types of fluid machineries
- To study the different types of pumps and machineries
- To study the fluid systems

Course Outcomes:

- The Students will get the knowledge of turbines and pumps
- The students will know about the fluid systems.
- The students will become familiar to the hydraulic machines.

- UNIT I** **Impact of Free Jets:** Impulse momentum principle, force exerted by the jet on stationary flat and curved plate, hinged plate, moving plate and moving curve vanes, jet propulsion of ship.
Impulse Turbine: Classification of turbine, impulse turbine, Pelton wheel, Construction working, work done, head efficiency and Design aspects, Governing of impulse turbine.
- UNIT II** **Reaction Turbine:** Radial flow reaction turbine, Francis turbine: construction, working, workdone, efficiency, design aspect, advantages & disadvantages over pelton wheel.
Axial flow reaction turbine: Propeller and Kaplan turbine, bulb or tubular turbine, draft tube, specific speed, unit quantities, cavitation, degree of reaction, performance characteristics, surge tanks, governing of reaction turbine.
- UNIT III** **Centrifugal Pumps:** Classification of Pumps, Centrifugal pump, Construction, working, workdone, heads, efficiencies, multistage centrifugal pump, pump in series and parallel, specific speed, characteristic, net positive suction head, cavitation.
- UNIT IV** **Reciprocating Pumps:** Classification, component and working, single acting and double acting, discharge, work done and power required, coefficient of discharge, indicator diagram, air vessels.
- UNIT V** **Fluid system:** Hydraulic accumulator, Hydraulic intensifier, Hydraulic Press, hydraulic crane, hydraulic lift, hydraulic Ram, hydraulic coupling, hydraulic torque converter, air lift pump, jet pump.
Fluidics: Technology, Terminology, types of fluid logic elements, amplifiers, logic states, methods of obtaining input signals and power outputs, application of fluidics, third generation fluidics.

TEXT BOOKS:

1. A Textbook of Hydraulic Machines – R. K. Rajput – S. Chand & Company Ltd.
2. Hydraulic Machines including Fluidics by Dr. Jagdish Lal, Metropolitan Book Company Private Limited, New Delhi

REFERENCE BOOKS:

- Fluid Mechanics and Fluid Power Engineering – D.S. Kumar– Kataria & Sons
- Hydraulics and Fluid Mechanics – Modi P.N, Seth S.M. – Standard Book House
- Introduction to Fluid Mechanics and Fluid Machines – S.K. Som & G. Biswas– TMH

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|-------------------------------------|--|-------------------------------------|--------------------|-----------------------|-----------|
| Branch: | Mechatronics Engineering | Semester: | V | | |
| Subject: | Microcontroller Based System Design | Code: | 367556 (67) | | |
| Total Theory Periods: | 40 | Total Tutorial Periods: | 10 | | |
| No. of class Tests to be conducted: | 2 (Minimum) | No. of assignments to be submitted: | 2 (Minimum) | | |
| ESE Duration: | Three Hours | Maximum Marks in ESE: | 80 | Minimum Marks in ESE: | 28 |

Course Objectives:

- Understand basic microcontroller
- Understand counters and timer functions of microcontroller.
- Understanding communication with microcontroller and interfacing with 8051
- Understand the basic concepts of embedded systems.

Course Outcomes:

- The Students will get basic knowledge of all types of microcontroller.
- They will get the basic knowledge of programming techniques with 8051 microcontroller
- The basic concepts of embedded system is studied.
- The concept of interfacing devices with 8051 is known.

- UNIT I Introduction to Microcontroller & Instruction Set:** A brief History of 8051, 8052, 8031, 8751, AT89C51, Pin configuration of 8051, 89C52RD2. Instruction set and Assembly language programming , Internal structure of 8051 , Power resetting , Built up RAM & ROM, I/O programming and Addressing modes. History of microcontroller, Features of advanced microcontrollers.
- UNIT II Counter and Timer details:** Counter and timer programming using 8051, interrupt programming, Types of interrupt.
- UNIT III Serial communication:** Data programming, RS232 standard, RS422 Standard, 1488 & 1489 standard, GPIB, Max 232 Driver, Serial communication programming (by USART & UART).
- UNIT IV Embedded System:** Introduction to the Embedded Systems, Processor Structure, registers and memories, the Parallel and Serial communication ports, the timers, the Interrupts, Programming an Embedded System embedded design concept, Embedded design card.
- UNIT V Interfacing:** ADC & DAC interfacing, stepper motor interfacing, keyboard interfacing, Memory interfacing DC Motor interfacing with 8051, 8096 Architecture.

Text Books:

- 1.The 8051 Microcontroller and Embedded Systems using Assembly and C, Mazidi, Mazidi& McKinlay,2nd Ed.,PHI
2. Microcontrollers: Architecture, Programming, Interfacing and System Design, Rajkamal, PearsonEducation.

Reference Books:

1. 8051 Programming, Interfacing and Applications K.J.Ayala, Penram Pub.
2. 8 bit Microcontrollers & Embedded Systems Manual.
3. Programming and Customizing the 8051 Microcontroller, Predko; TMH
4. Handbook of Microcontrollers, MykePredko, TMH
5. Arm System Developer's Guide by ANDREW N. Sloss, ELSEVIER Publication (MORGAN KUAFMANN Publisher)

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Branch: **Mechatronics Engineering**
Subject: **Machine Design I Laboratory**
Total Lab Periods: **36**
Maximum Marks: **40**

Semester: **V**
Code: **367561(67)**
Batch Size: **30**
Minimum Marks: **20**

List of Experiments/Activities:

- Select a daily use product and design the conceptual design by applying the design process taking the controlling parameters
- Make a list of mechanical components and know their materials and suggest some alternative materials for each one of them.
- Find a flange coupling in the college laboratory and justify its design by actual measurements
- Design a shaft used in some practical application, by actual working and loading conditions
- Justify the design of single plate clutch of an engine assembly
- Design a wall bracket, which is being used in real life by actual measurement of load
 - Welded joints
 - Riveted and bolted joints

In addition, justify your findings.

- Design a screw jack.
- Design a software in some high level language or excel sheets for design of a component
- **Mini Project:** Each student will be given a real life problem for the complete design of a subsystem/system using either manual calculation with the help of design handbook or through computer programme, if needed. This will be done as home assignment to be submitted at the end of the semester.

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Branch: **Mechatronics Engineering**
Subject: **Dynamics of Machines Laboratory**
Total Lab Periods: **36**
Maximum Marks: **40**

Semester: **V**
Code: **367562(67)**
Batch Size: **30**
Minimum Marks: **20**

List of Experiments to be Performed (Minimum ten experiments are to be performed by each student)

1. To find out the oscillations of simple pendulum with universal vibration apparatus.
2. To find out the oscillations of Compound pendulum with universal vibration apparatus.
3. To find out the radius of gyration of bi-filler suspension with universal vibration apparatus.
4. To find out undamped torsional vibrations of single rotor system with universal vibration apparatus.
5. To find out the frequency of damped torsional vibration of single rotor system with universal vibration vibration apparatus.
6. To measure the frequency of torsional vibrations of single rotor system with universal vibration apparatus.
7. To measure the frequency of torsional vibrations of double rotor system with universal vibration apparatus.
8. To find out free vibration of helical coiled spring with universal vibration apparatus.
9. To study forced damped vibration of a spring mass system and simple supported beam with universal vibration apparatus.
10. To find out the Gyroscopic couple and prove the Gyroscopic law with Gyroscope apparatus.
11. To find out the Power and effort of Proel, Porter & Hartnell Governor with Governor Apparatus.
12. To find out the critical speed for different diameters of shaft by whirling of shaft apparatus.
13. To verify the static and dynamic balancing for different planes and masses by balancing apparatus.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Universal Vibration Apparatus
2. Whirling of Shaft Apparatus.
3. Balancing Apparatus (Both Static & Dynamic)
4. Epicyclic Gear Train and Holding Torque Apparatus
5. Gyroscope apparatus
6. Governor apparatus with differential attachments

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|--|--------------------------|
| Branch: Mechatronics Engineering | Semester: V |
| Subject: Microcontroller Based System Design Laboratory | Code: 367563(67) |
| Total Lab Periods: 36 | Batch Size: 30 |
| Maximum Marks: 40 | Minimum Marks: 20 |

List of Experiments (Minimum ten experiments to be performed)

1. Write a program and implement using Atmel 89C51 to blink LED with 0.5 Hz
2. Write a program and implement using Atmel 98C51 for 8 bit binary UP counter.
3. Write a program and implement using Atmel 98C51 for 8 bit binary DOWN counter.
- 4 Write a program and implement using Atmel 89C51 to interface a switch and 8 LED for binary UP counter when switch is closed and pause the counter when switch is open.
5. Write a program and implement using Atmel 89C51 to generate square waveforms
6. Write a program and implement using Atmel 89C51 to generate stair case waveforms
7. Write a program and implement using Atmel 89C51 to generate triangular waveforms with period of 1 ms.
8. Write a program and implement using Atmel 89C51 for frequency counter to display frequency in 2 digits on SSD.
9. Write a program and implement using Atmel 89C51 for stepper motor direction control using a switch.
10. Write a program and implement using Atmel 89C51 to display Microcontroller on 2X8 LCD module
11. Interface 8 LED and 8 switches & write ALP to display status of switch using 8255
12. Interface Hex Key board and seven segment display to display key pressed on SSD
13. Write ALP to generate triangular waveform of frequency 500 HZ using DAC 0809 with 8255 & 8051 microcontroller
- 14 Design stepper motor controller and write an ALP to rotate shaft stepper motor in 1.) clockwise 5 rotation & 2) anticlockwise 5 rotations.

List of Equipments required

- Atmel 89C51
- 8255 & 8051 microcontroller

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Branch: **Mechatronics Engineering**
Subject: **Fluid Machines and Fluidics Laboratory**
Total Lab Periods: **36**
Maximum Marks: **40**

Semester: **V**
Code: **367564(67)**
Batch Size: **30**
Minimum Marks: **20**

List of Experiments/Studies to be Performed (Minimum seven experiments and three studies are to be performed by each student)

1. Performance characteristics of Pelton wheel turbine.
2. Performance characteristics of Francis turbine.
3. Performance characteristics of Kaplan turbine.
4. Performance characteristics of variable speed centrifugal pump.
5. Performance characteristics of rated speed centrifugal pump.
6. Performance characteristics of multistage centrifugal pump.
7. Study of Wind Tunnel (Open Circuit blower type)
8. Determination of Lift and drag force over an air foil.
9. To study the working of fluidic devices (Analog and Digital)
10. To study the Hydraulic Accumulator
11. To study the Hydraulic Intensifier
12. To study the Hydraulic Crane
13. To study the Hydraulic lift
14. To study the Hydraulic Ram
15. To study the Jet Pump
16. To study the Air Lift Pump

List of Equipments/Machines Required:

1. Pelton Wheel Turbine
2. Francis Turbine Test Rig
3. Kaplan Turbine Test Rig
4. Variable Speed Centrifugal Pump Test Rig
5. Rated Speed Centrifugal Pump Test Rig
6. Multi Stage Centrifugal Pump Test Rig
7. Reciprocating Pump Test Rig
8. Complete setup of Wind Tunnel (Open circuit blow type) with minimum wind speed not less than 30m/sec.
9. Fluidic devices (Analog and Digital)
10. Airofoil with the provision of measurement of pressure distribution over the surface.
11. Cut section model of Hydraulic Accumulator
12. Cut section model of Hydraulic Intensifier
13. Cut section model of Hydraulic Crane
14. Cut section model of Hydraulic Lift
15. Cut section model of Hydraulic Ram
16. Cut section model of Hydraulic Jet and Air lift pump.

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|---------------------|--------------------------------|--|--------------------|
| Name of Program: | Bachelor of Engineering | Semester: | V |
| Branch: | Common to All Branches | Code: | 300565 (46) |
| Subject: | Personality Development | Tutorial Period: | NIL |
| No. of Lectures: | 2/Week | Marks in TA: | 20 |
| Total Marks in ESE: | NIL | Minimum number of Class Tests to be conducted: | Two |

Objective: The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall development of an individual apart from gaining technical knowledge in the subject.

Course Objectives

Upon completion of this course, the student shall be able

- To understand the concept of personality and image;
- To develop leadership, listening and interacting skills;
- To develop attitudinal changes;
- To develop decision-making qualities; and
- To communication skill.

UNIT I **Personality concepts:** What is Personality – its physical and psychic aspects. How to develop a positive self-image. How to aim at Excellence. How to apply the cosmic laws that govern life and personality. How to improve Memory – How to develop successful learning skills. How to develop and effectively use one's creative power. How to apply the individual MOTIVATORS that make you a self-power personality.

UNIT II **Interpersonal Skills:** Leadership: Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes. Listening: Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging. How to win friends and influence people, How to get along with others. How to develop art of convincing others. How can one make the difference. How to deal with others particularly elders. Conflicts and cooperation.

UNIT III **Attitudinal Changes: Meaning of attitude,** benefits of positive attitudes, How to develop the habit of positive thinking.

Negative attitude and wining: What is FEAR and how to win it. How to win loneliness. How to win over FAILURE. How to win over PAIN. How to win over one's ANGER and others anger. What is stress and how to cope up with it? The art of self-motivation. How to acquire mental well-being. How to acquire physical well-being.

UNIT IV **Decision Making:** How to make your own LUCK. How to plan goals/objectives and action plan to achieve them. How to make RIGHT DECISION and overcome problems. How to make a Decision. Decision making: A question of style. Which style, when? People decisions: The key decisions. What do we know about group decision making? General aids towards improving group decision making.

UNIT V **Communication Skills: Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.

Study & Examination: How to tackle examination, How to develop successful study skills.

Group discussions: Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

Course Outcomes:

- The students will be able to develop inner and outer personality exposure;
- The students will be able to develop effective leadership qualities and interacting skills;
- The students will be able to develop positive attitude, motivating skills and develop winning philosophies;
- The students will be able to develop decision-making tools; and
- The students will be able to develop group presentation, public speaking and impressive conversation.

Text Books:

1. Basic Managerial Skills for all by E. H. McGrawth, prentice Hall India Pvt. Ltd., 2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

Reference Books:

1. How to Develop a Pleasing Personality by Atul John Rego, Better Yourself Books, Mumbai, 2000
2. How to Succeed by Brain Adams, Better Yourself Books, Mumbai, 1969
3. Personality: Classic Theories & Modern Research; Friedman ; Pearson Education, 2006
4. How to Win Friends and Influence People by Dale Carnigie, A. H. Wheeler 2006