

Chhattisgarh Swami Vivekananda Technical University, Bilai

Name of program: **Bachelor of Technology**

Branch: **Mechatronics Engineering**

Subject: **Kinematics of Machines**

Total Theory Periods: **03**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours Maximum**

Semester: **IV**

Code: B067411(067)

Total Tutorial Periods: **01**

Assignments: **Two (Minimum)**

Marks: 100 Minimum Marks: 35

Course Objectives:

- To synthesise, both graphically and analytically, multilink mechanisms.
- To perform mechanism analyses to find the position, velocity, acceleration, and dynamics of multi-bar mechanisms.
- To synthesise mechanism to perform certain prescribed task/motion
- To analyze gear trains.
- To analyze thrust bearings, Brakes and dynamometers.

UNIT-I

RELATIVE VELOCITY: Elements, pairs, Mechanism, Four bar chain and its inversion, Velocity diagrams, Relative velocity method, Instantaneous centre method.

UNIT-II

RELATIVE ACCELERATION: Synthesis of mechanism, Pantograph, Lower pair mechanism, Relative Acceleration diagram, Klein's construction, Coriolis component of acceleration.

UNIT-III

CAMS: Classification of cams and followers, Nomenclature of a radial cam, Description of follower movement, Displacement diagrams, Uniform and modified uniform motion, Simple harmonic motion, Uniform acceleration motion and its modifications, Cycloidal motion, Synthesis of cam profile by graphical approach, Considerations of pressure angle. Cams with specified contours: Circular arc cam & tangent cam.

UNIT-IV

GEAR: Types of gears, Gear terminology, Law of gearing, Gear tooth forms, Involute and Cycloid tooth profile, Interference and Undercutting of Involute teeth, Minimum number of teeth on pinion to avoid interference.

GEAR TRAINS: Simple, Compound, Reverted, and Epicyclical gear trains, computation of velocity ratio in gear trains by different methods.

UNIT-V

FRICITION: Applications of friction, Pivot and collar friction; Thrust bearing.

BELT-DRIVES: Ratio of tensions for flat belt & V-belt, Centrifugal tension, condition for maximum power transmission.

BRAKES AND DYNAMOMETER: Simple block and shoe brake, Band brake, Band and block brake, and internal expanding shoe brake, Absorption dynamometer, Transmission dynamometer.

Text Books:

1. Theory of Machines – S. S. Rattan, Tata McGraw Hill.
2. The Theory of Machine – Thomas Beven – CBS Publishers.

Reference Books:

1. Theory of Mechanism and Machines – A. Ghosh, A. K. Mallik, EWP Press.
2. Theory of Machine – Shigley, J. E., McGraw Hill.
3. Theory of Machine – Jagdish Lal, Metropolitan Book Co. (P) Ltd.
4. Theory of Machine – J. E. Singh, McGraw Hill.

Course Outcomes:

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

Chhattisgarh Swami Vivekananda Technical University, Bilai

Name of program: **Bachelor of Technology**

Branch: **Mechatronics Engineering**

Subject: **Microprocessor and Microcontroller**

Total Theory Periods: **03**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours Maximum**

Semester: **IV**

Code: B067412(067)

Total Tutorial Periods: **01**

Assignments: **Two (Minimum)**

Marks: 100 Minimum Marks: 35

Course Objectives:

- To introduce the architecture, interfacing and programming of 8085 microprocessor and various peripheral interfacing devices.
- To understand the basic microcontroller
- To understand the counters and timer functions of microcontroller.
- To understand the communication with microcontroller and interfacing with 8051
- To understand the basic concepts of embedded systems.

UNIT- I

MICROPROCESSOR ARCHITECTURE: Introduction to Microprocessors, Architecture of 8085, Pin Configuration and Function, internal register & flag register, Generation of Control Signals: Bus Timings: De-multiplexing of address / data bus; Fetch Cycle, Execute Cycle, Instruction Cycle, Instruction Timings and Operation Status, Timing Diagram.

UNIT II

INTRODUCTION TO MICROCONTROLLER & INSTRUCTION SET: A brief History of 8051, 8052, 8031, 8751, AT89C51, Pin configuration of 8051, Instruction set and Assembly language programming, Internal structure of 8051, Power resetting, Built up RAM & ROM, I/O programming and Addressing modes. Features of advanced microcontrollers.

UNIT III

COUNTER AND TIMER DETAILS: Counter and timer programming using 8051, Types of interrupt, interrupt programming.

UNIT IV

SERIAL COMMUNICATION: Data programming, RS232 standard, RS422 Standard, 1488 & 1489 standard, GPIB, Max 232 Driver, Serial communication programming (by USART & UART).

UNIT V

INTERFACING: ADC & DAC interfacing, stepper motor interfacing, keyboard interfacing, LCD Interfacing, Memory interfacing, DC Motor interfacing with 8051.

Text Books:

1. Microprocessor Architecture, Programming and Application - R. S. Gaonkar, Wiley Eastern
2. The 8051 Microcontroller and Embedded Systems using Assembly and C, - Mazidi, Mazidi & McKinlay, 2nd Ed., PHI
3. Digital Systems – From Gates to Microprocessors - Sanjay K. Bose, New Age International Publishers.

REFERENCE BOOKS

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

Course outcomes:

- The students will gain knowledge about architecture of general purpose microprocessor.
- 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 known.
- The concept of interfacing devices with 8051 is known.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of program: **Bachelor of Technology**

Branch: **Mechatronics Engineering**

Subject: **Modern Control Systems**

Total Theory Periods: **03**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours Maximum**

Semester: **IV**

Code: **B067413(067)**

Total Tutorial Periods: **01**

Assignments: **Two (Minimum)**

Marks: **100** **Minimum Marks: 35**

Course Objectives:

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

UNIT I

BASIC CONCEPTS: 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 and Non feedback systems, reduction of parameter variation, control of system dynamic, 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, Nyquist 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 - Dorf & Bishop, Pearson, 11th Ed.
3. Automatic Control System - B.C. Kuo, P.H.I.

REFERENCE BOOKS

1. Modern Control Engineering – Ogata, Pearson Education
2. Control Systems Engineering Using MATLAB – S. N. Sivanandam & S. N. 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.

Course Outcomes:

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

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of program: **Bachelor of Technology**

Branch: **Mechatronics Engineering**

Subject: **Fluid Mechanics**

Total Theory Periods: **02**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours Maximum**

Semester: **IV**

Code: B067414(067)

Total Tutorial Periods: **01**

Assignments: **Two (Minimum)**

Marks: 100 Minimum Marks: 35

Course Objectives:

- To obtain a solid understanding of the fundamentals of Fluid Mechanics
- To develop the ability to formulate basic equations for Fluid Engineering problems
- To develop the ability to use tables and figures to determine the friction energy loss for various pipes/ducts geometries and fluid engineering applications
- To develop the ability to perform dimensional analysis and identify important parameters

UNIT-I

PROPERTIES OF FLUID: Fluid, ideal and real fluid, properties of fluid: mass density, weight density, specific volume, specific gravity, viscosity, surface tension, capillarity, vapor pressure, compressibility and bulk modulus. Newtonian and non-Newtonian fluids

FLUID STATICS: Pressure, Pascal's law, Hydrostatic law, Manometry, Hydrostatic force on submerged plane and curved surface, Buoyancy and Flotation.

UNIT-II

FLUID KINEMATICS: Description of fluid motion, Lagrangian and Eulerian approach, Type of fluid flow, Type of flow lines-path line, streak line, stream line, stream tube. Continuity equation, acceleration of a fluid particle, motion of fluid particle along curved path, Normal and tangential acceleration, Rotational flow, Rotation and Vorticity, circulation, stream and potential function, flow net ,its characteristics and utilities. Liquid in relative equilibrium.

UNIT-III

FLUID DYNAMICS: Euler's Equation, Bernoulli's equation and its practical application, Venturimeter, Orifice meter, Nozzle, Pitot tube, Impulse momentum equation, Momentum of Momentum equation, Kinetic energy and Momentum correction factor, Vortex motion, Radial flow.

UNIT-IV

LAMINAR FLOW: Reynolds' experiment, flow of viscous fluids in circular pipe, shear stress and pressure gradient relationship, Velocity distribution, Hagen-Poiseuille Equation, flow of viscous fluids between two parallel plates (Couette flow) shear stress and pressure gradient relationship, Velocity distribution, Drop of pressure head.

TURBULENT FLOW: Effect of turbulence, Expression for loss of head due to friction in pipes (Darcy-Weisbach equation), Expression for co-efficient of friction in terms of shear stress.

FLOW THROUGH PIPE: Loss of energy in pipes, Hydraulic gradient and total energy line, pipe in series and parallel, equivalent pipe power transmission through pipe, water hammer in pipes.

UNIT-V

DIMENSIONAL ANALYSIS: Methods of dimensional analysis, Rayleigh's method, Buckingham's theorem, Limitations.

MODEL ANALYSIS: Dimensionless number and their significance, model laws, Reynolds's model law, Froude's model law, Euler's model law, Weber's model law, Mach's model law, Type of models, scale effect in model, limitation of hydraulic similitude.

Text Books:

1. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar, Kataria & Sons, New Delhi
2. A text of Fluid Mechanics – R. K. Rajput, S. Chand & Company Ltd., Delhi

Reference Books:

1. Fluid Mechanics & Hydraulics Machines – R. K. Bansal, Laxmi Publications, Delhi
2. Engineering Fluid Mechanics – K. L. Kumar, Eurasia Publication House, Delhi
3. Mechanics of Fluid – B. S. Massey, English Language Book Society (U.K.)
4. Fluid Mechanics – Yunush A. Cengel, John M. Cimbala- TMH, Delhi
5. Introduction to Fluid Mechanics and Fluid Machines – S. K. Som and G. Biswas- TMH, Delhi
6. Hydraulics and Fluid Mechanics Including Hydraulic Machine - P. N. Modi & S. M. Seth, Standard, Delhi
7. Theory and Application of Fluid Mechanics – K. Subramanya, TMH Delhi

Course Outcomes:

- The students will be able to apply knowledge of fluid mechanics in formulating and solving engineering problems.
- The students will acquire the knowledge of fluid mechanics for the design and development of mechanical systems.
- The students will demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- The students will identify, analyse, and solve mechanical engineering problems useful to the society.
- The students will work effectively with engineering and science teams as well as with multidisciplinary teams.
- The students will skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.
- The students will develop fundamentals to continue the study of the advance subjects like fluid machinery, heat and mass transfer etc.

Chhattisgarh Swami Vivekananda Technical University, Bilai

Name of program: **Bachelor of Technology**

Branch: **Mechatronics Engineering**

Subject: **Thermal Engineering**

Total Theory Periods: **02**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours Maximum**

Semester: **IV**

Code: **B067415(067)**

Total Tutorial Periods: **00**

Assignments: **Two (Minimum)**

Marks: 100 Minimum Marks: 35

Course Objectives:

- To understand the analysis of second law.
- To understand the thermodynamic relationships and equation of gases.
- To understand the vapour and vapour power cycle and steam condenser.
- To understand refrigeration cycle and reciprocating air compressors.
- To gain knowledge of thermodynamics of compressible Fluids

UNIT-1:

INTRODUCTION TO ENGINEERING THERMODYNAMICS-Macroscopic vs microscopic view point, Thermodynamic System, properties, process, cycle, thermodynamic equilibrium, Quasi-static Process, Zeroth Law of thermodynamics, concept of continuum. Exact & Inexact differentials. Work-electrical, magnetic, gravitational, spring and shaft work, Displacement work, flow work, free expansion, work done in various quasi-static process, work as a path function. Heat transfer-sensible heat, latent heat, heat as a path function.

FIRST LAW OF THERMODYNAMICS-Joule's experiment, internal energy as property of system, first law applied to various quasi-static process, PMMI, Limitations of the First Law, control volume, Steady flow energy equation, Applications of SFEE.

UNIT-II:

SECOND LAW OF THERMODYNAMICS: Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius statements and their equivalence, PMM of Second kind, reversibility and irreversibility, causes of irreversibility, Carnot cycle, Carnot theorem, Absolute thermodynamic temperature scale.

Clausius theorem, the property of entropy, the inequality of Clausius, Entropy principle and its applications

UNIT-III:

VAPOUR AND VAPOUR POWER CYCLE:

VAPOUR: Properties and processes in ideal vapour; use of steam tables and Mollier's diagram in determination of steam properties, energy and entropy calculations.

VAPOUR POWER CYCLE: Simple steam power cycle, Rankine cycle; p-v, T-s and h-s diagrams, efficiency, steam rate, heat rate, Carnot and Rankine cycle as applied to steam power plants, Reheat cycle, ideal regenerative cycle, practical regenerative cycle, characteristics of ideal working fluids, binary vapour cycle.

UNIT-IV:

INTERNAL COMBUSTION (I.C.) ENGINES: Introduction of Internal and external combustion engine and their comparison, four stroke cycle S.I. and C.I. engine, two stroke engine, comparison of four stroke and two stroke engines, comparison of S.I. and C.I. engine, classification of I.C. Engine, Valve timing diagram for S.I. and C.I. engines, Performance parameters and their calculations.

UNIT-V:

SOLAR ENERGY CONVERSION: Classical sources of energy crisis and search for alternative sources of energy. Solar energy, earth sun angles, resolution, solar measurement, collection of solar energy, flat plate and focusing collector analysis, calculations and same design parameters. Applications of solar energy. Introduction to Photovoltaic cell energy conversion techniques.

Text Books:

1. Steam and Gas turbine – R. Yadav, Central Publishing House, Allahabad
2. Non-Conventional Energy Sources – G. D. Rai, Khanna Publishers
3. Engineering Thermodynamics – P. K. Nag, TMH Publishers, New Delhi
4. A Course in Internal Combustion Engines – M. L. Mathur & R. P. Sharma, Dhanpat Rai & Sons

Reference Books:

1. Turbine compressors and Fans – S.M. Yahya, TMH New Delhi
2. Gas Turbine – V. Ganeshan, TMH New Delhi
3. Thermal Science & Engineering – D. S. Kumar, S. K. Kataria & Sons

Course Outcomes:

- The students will be able to understand the analysis of first law.
- The students will be able to understand the analysis of second law.
- The students will be able to understand the thermodynamic relationships and equation of gases.
- The students will be able to understand the vapour and vapour power cycle and steam condenser.
- The students will be able to understand refrigeration cycle and reciprocating air compressors.
- The students will be able to gain knowledge of thermodynamics of compressible fluids

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of program: Bachelor of Technology

Branch: Mechatronics Engineering

Subject: Kinematics of Machines Lab

Total Periods: 02

Maximum Marks: 40

Semester: IV

Code: B067421(067)

Minimum Marks: 20

List of Experiments (Minimum ten experiments are to be performed)

1. To determine the jump phenomena of cam follower apparatus.
2. To draw displacement, velocity and acceleration curve of cam motion.
3. To find out the load carrying capacity of bearing.
4. To find out the coefficient of friction of bearing.
5. To find out the frictional horse power of bearing.
6. To find out the pressure around the bearing by journal bearing apparatus.
7. To measure co-efficient of friction, power transmitted with varied belt tension by slip & creep apparatus.
8. To find out the percentage slip at fixed belt tension by varying load with slip & creep apparatus.
9. To find out belt slip and creep by slip and creep measurement apparatus.
10. To verify the Corioli's component of acceleration with theoretical and practical results.
11. To find the speed and torque of different gear in an epicyclic gear train.
12. To find the speed and torque of different gear in a simple, compound and reverted gear train.
13. To Study and analysis of Pantograph.
14. To study Four-bar mechanism and its inversions.
15. To study internal expanding and external contracting shoe brakes.
16. To study rope brake dynamometer and calculation of torque and power.

List of Equipment/Instruments/Machines/Software Required:

- Cam analysis apparatus
- Journal bearing apparatus.
- Corioli's component of acceleration apparatus
- Slip & Creep Measurement Apparatus in Belt Drive
- Simple, compound, reverted and epicyclic gear train apparatus.
- Pantograph apparatus (with all accessories)
- Internal / external shoe brake (complete set with accessories)
- Four bar mechanism and its inversions.
- Rope brake dynamometer apparatus (with all accessories)
- Mechanoset.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of program: Bachelor of Technology

Branch: Mechatronics Engineering

Subject: Microprocessor and Microcontroller Lab

Total Periods: 02

Maximum Marks: 40

Semester: IV

Code: B067422(067)

Minimum Marks: 20

List of Experiments (Minimum ten experiments are to be performed)

1. Write a Program to perform following operation.
 - a. Add two 8 bit no. result store in R0 Register.
 - b. Sub two 8 bit no. result store in R1 Register.
 - c. Mul two 8 bit no. result store in RAM memory location 30h.
 - d. Div two 8 bit no. result store in RAM memory location 40h.
2. Write a program to add two 16 bit no. operands are two variable result to be in R1-R0 Register Pair.
3. Write a program to add two 32 bit no. operands are two variable result to be in R1-R0 Register Pair.
4. Write a Program to convert binary no. into decimal no. result to be in R5,R6,R7 register respectively where LSB in R7 register.
5. Write a Program to convert packed BCD no. in to two ASCII no.
6. Write a Program to transfer data 'CHHATTISGARH' from ROM location 240h to RAM location 50h. Using counter method and null char end of string method.
7. Write a program and implement using Atmel 89C51 to blink LED with 0.5 Hz
8. Write a program and implement using Atmel 98C51 for 8 bit binary UP counter.
9. Write a program and implement using Atmel 98C51 for 8 bit binary DOWN counter.
10. 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.
11. Write a program and implement using Atmel 89C51 to generate square waveforms of 2khz,2.5khz,and 25 hz at pin P1.0,P1.1,P1.2 respectively.
12. Write a program and implement using Atmel 89C51 for frequency counter to display frequency in 2 digits on SSD.
13. Write a program and implement using Atmel 89C51 for stepper motor direction control using a switch.
14. Write a program and implement using Atmel 89C51 to display 'MICROCONTROLLER' on 16x2 LCD module
15. Interface 8 LED and 8 switches & write ALP to display status of switch ON LED

List of Equipments required

- Atmel 89C51
- 8255 & 8051 microcontroller
- IDE 8051 Simulator

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of program: Bachelor of Technology

Branch: Mechatronics Engineering

Subject: Fluid Mechanics Lab

Total Periods: 02

Maximum Marks: 40

Semester: IV

Code: B067423(067)

Minimum Marks: 20

List of Experiments (Minimum ten experiments are to be performed)

1. To determine the meta-centric height of a ship model.
2. To verify Bernoulli's Theorem.
3. To verify Impulse Momentum Principle.
4. To calibrate a Venturimeter and study the variation of coefficient of discharge.
5. To calibrate an orifice-meter.
6. Experimental determination of critical velocity in pipe.
7. To determine of head loss in various pipe fittings.
8. Flow measurement using Pitot tube.
9. To study the transition from laminar to turbulent flow and to determine the lower critical Reynold's number.
10. To determine the hydraulic coefficients (C_c , C_d and C_v) of an orifice.
11. To determine the coefficient of discharge of a mouth piece.
12. To obtain the surface profile and the total head distribution of a forced vortex.
13. To study the velocity distribution in pipe and to compute the discharge by integrating velocity profile.
14. To study the variation of friction factor for pipe flow.
15. To determine the roughness coefficient of an open channel.

List of Equipment/Instruments/Machines/Software Required:

- Apparatus for determination of meta-centric height
- Bernoulli's apparatus
- Impact of jet apparatus
- Venturimeter
- Orificemeter
- Pipe friction apparatus
- Orifice apparatus
- Mouth Piece apparatus with the provision for determination of hydraulic coefficient C_c , C_d & C_v
- Vortex flow apparatus
- Apparatus of head loss in various pipe fittings.
- Reynold's apparatus
- Complete setup for flow measurement using Pitot tube
- Complete set for open channel apparatus

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of program: Bachelor of Technology

Branch: Mechatronics Engineering

Subject: Virtual Lab (Computer Aided Design & Manufacturing Lab)

Total Periods: 02

Maximum Marks: 40

Semester: IV

Code: B06724(067)

Minimum Marks: 20

Minimum ten experiments are to be carried out covering CAD and CAM.

A. CAD Experiments

1. Line Drawing or Circle Drawing experiment: Writing and validation of computer program.
2. Geometric Transformation algorithm experiment for translation/rotation/scaling: Writing and validation of computer program.
3. Design of machine component or other system experiment: Writing and validation of computer program.
4. Understanding and use of any 3-D Modeling Software commands.
5. Experiment: Solid modeling of a machine component using Advanced-modeling software.
6. Root findings or curve fitting experiment: Writing and validation of computer program.
7. Numerical differentiation or numerical integration experiment: Writing and validation of computer program.

B. CAM Experiments

1. To study the constructional detail of CNC lathe.
2. To study the constructional detail of CNC milling machine.
3. To study the characteristic features of CNC machine.
4. To prepare part programming for plain turning operation.
5. To prepare part programming for milling operation.
6. To prepare part programming for turning operation in absolute mode.
7. To prepare part programming for milling operation in absolute mode.
8. To prepare part program in inch mode for plain turning operation.
9. Part Programming (in word address format or ATP) experiment for drilling operation (point to point) and running on CNC machine

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. CAD Software
2. Computer Numerically Control Lathe Trainer
3. Computer Numerically Control Milling Machine
4. P-IV (IBM) 2.6 GHz, 80 GB HDD, 256/512 SD RAM (Compatible with CAD Software) 52 X CD RW, 1.44 MB FDD, 17" Colour Monitor, Laser Scroll Mouse
5. CNC Controlled Drilling Machine

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Technology**

Branch: **Common to All Branches**

Semester: **IV**

Subject: **Indian Culture and Constitution of India**

Code: **B000406(046)**

Total Theory Periods: **2/Week**

Total Tutorial Periods: **NIL**

Assignments: **Two (Minimum)**

Total Marks in ESE: **NIL**

Marks in TA: **10**

Objective: The Constitution is the supreme law and it helps to maintain **integrity** in the society and to promote unity among the citizens to build a great nation. The main objective of the Indian Constitution is to promote harmony throughout the nation.

Course Objectives

Upon completion of this course, the student shall be able

- To understand Meaning and concepts of Traditional and Modern of Culture
- To understand Sources of the Study of Indian Culture
- To Enable the student to understand the history and importance of constitution
- To understand philosophy of fundamental rights and duties
- To understand the powers and functions of executive, legislature and judiciary
- To understand the powers and functions of state government
- To understand the recent trends in Indian constitutional and election commission of India.

To understand the central and state relation, financial and administrative.

UNIT-I

Meaning and concepts of Culture: Traditional and Modern concepts of Culture-Notions of Culture in textual tradition, anthropological, archaeological and sociological understanding of the term culture. Elements of Culture, concept of Indianness and value system. Relation between culture and civilization. Historiography and approaches to the study of Indian Culture– Stereotypes, Objectivity and Bias, Imperialist, Nationalist, Marxist and Subaltern. Heritage of India and world's debt to Indian Culture.

UNIT-II

Sources of the Study of Indian Culture: Archaeological: cultural remains, Monuments, Numismatics, Epigraphy; Literary sources and Oral traditions; Foreign Accounts; Archival sources.

UNIT-III

History of Indian Constitution Constitutional History, Preamble salient features, citizenship, Method of Amendment and Recent Amendments. **Rights and Duties** Fundamental Rights and Directive Principles of State Policy. Fundamental Duties. Difference between Fundamental Rights and Directive Principles of State Policy

Union Government a) President-powers and functions. Vice president powers and functions, Prime Minister and council of ministers powers and functions. b) Parliament- Lok Sabha, Rajya Sabha- composition powers and functions.

c) Judiciary (Supreme Court) composition powers and functions Judicial Activism

UNIT-IV

State Government a) Governor: powers and functions b) Chief minister: powers and functions c) State Legislative Assembly and Legislative Council- composition powers and functions. d) High Court : composition powers and functions

UNIT-V

Recent Trends in Indian Constitutional a) Basic structure of Indian Constitution. b) Electoral Reforms c) Panchayati Raj system in India.

Books of Reference

1. **Dr. P. K. Agrawal** Indian Culture, Art and Heritage,
2. **P. Raghunadha Rao** Indian Heritage and Culture
3. M.V.Pylee, An Introduction to the Constitution of India, New Delhi, Vikas, 2005.
4. Subhash C. Kashyap, Our Constitution: An Introduction to India's Constitution and constitutional Law, New Delhi, National Book Trust, 2000.
5. Durga Das Basu, Introduction to the Constitution of India, New Delhi, Prentice Hall of India, 2001.
6. D.C. Gupta, Indian Government and Politics, VIII Edition, New Delhi, Vikas, 1994.
7. V.D. Mahajan, Constitutional Development and National Movement in India, New Delhi, S. Chand and Co., latest edition.