

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

SCHEME OF TEACHING AND EXAMINATION

B.E. IV 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.	Mech. Engg.	337411 (37)	Computer Graphics	4	1	-	80	20	20	120	5
2.	Mech. Engg.	337415 (37)	Mechanical Measurements and Metrology	4	1	-	80	20	20	120	5
3.	Mech. Engg.	367411 (37)	Thermal Engg.	4	1	-	80	20	20	120	5
4.	Mech. Engg.	337414 (37)	Kinematics of Machines	4	1	-	80	20	20	120	5
5.	Electronics and Telecom	328413 (28)	Analog Electronic Circuits	4	1	-	80	20	20	120	5
6.	Applied Mathematics	328411 (14)	Mathematics - IV	3	1	-	80	20	20	120	4
7.	Mech. Engg.	337421 (37)	Computer Graphics Lab	-	-	2	40	-	20	60	1
8.	Mech. Engg.	337424 (37)	Mechanical Measurements and Metrology Lab	-	-	2	40	-	20	60	1
9.	Electronics and Telecom	328421 (28)	Analog Electronic Circuits Lab	-	-	2	40	-	20	60	1
10.	Mech. Engg.	337423 (37)	Kinematics of Machines Lab	-	-	2	40	-	20	60	1
11.	Humanities	300425 (46)	Health ,Hygiene and Yoga	-	-	2	-	-	40	40	1
12.			Library	-	-	1	-	-	-	-	-
			Total	23	6	11	640	120	240	1000	34

L – Lecture, T – Tutorial,

P – Practical, ESE- End Semester Exam, CT- Class Test, TA – Teacher’s Assessment

Note (1): Duration of all theory papers will be of **Three Hours**.

Note (2): Industrial Training of four weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV sem. after which students have to submit a training report which will be evaluated by the College teachers during B.E. V Sem.

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

Semester : B.E. IV Semester Branch : Mechanical , Mechatronics Engg.
Sub : Computer Graphics Code : 337411 (37)
Total Theory Periods : 40 Total Tutorial Periods : 10

Total Marks in End Semester Exam : 80

Minimum number of class tests to be conducted : 02

UNIT - I

Introduction,

Application Areas. Input and Output Devices:- Keyboard, Mouse, Z mouse Trackball, Joysticks, Data Glove, Digitizers, Light pen, Touch Panels, Image scanners, Printers and Plotters. Video Display Devices: Refresh CRT; Raster & Random scan display; Color CRT monitor; Flat panel display; Co-ordinate representation.

UNIT – II

Basic Raster Graphics Algorithm for drawing 2-D primitives

Output Characteristics: Aspect ratio; Aliasing and Anti-aliasing. Line Drawing Algorithms: DDA algorithm; Bresenham's algorithm. Circle Generation Algorithm: Midpoint circle algorithm. Ellipse Generation Algorithm: Mid-point ellipse algorithm. Area filling: Inside-outside test; Boundary fill algorithm- 4 and 8 connected area; flood-fill algorithm.

UNIT - III

2-D Geometric Transformation

Window and View port: Window and View port relationship; World co-ordinates; Normalized device co-ordinates and Homogenous co-ordinates. Basic Transformations: Translation; Rotation and Scaling. Other Transformation: Reflection and Shear. Composite Transformation.

UNIT - IV

2-D Viewing and Clipping

Viewing world coordinates system, normalized coordinate system, device, image coordinate system, window definition, view port definitions, viewing transformation. Clipping: Point clipping; Line: Cohen-Sutherland algorithm, Mid-point Polygon.

UNIT - V

3-D Concepts and curves

3-D Display Methods: Parallel and Perspective projections; 3-D Transformation: Basic Transformations: translation, rotation and scaling

Curves

Spline Representation, Bezier Curves single and multiple segments , Cubic-spline and their parametric forms

TEXT BOOKS

1. Computer Graphics – N. Krishnamurthy –TMH
2. Donald Hearn and M. Pauline Baker- Computer Graphics with C version - Low Price Edition, 2nd Edition, 2002.

REFERENCE BOOKS

1. Rogers and Adams - Mathematical Elements for Computer Graphics – TMH
2. Xiang and Plastok - Schaum's Outlines Computer Graphics - TMH, 2nd Edition, 2002.
3. Harrington - Computer Graphics - McGraw Hill
4. Rogers, "Procedural Elements for Computer Graphics – TMH
5. Cad Cam Theory and Practice by Ibrahim Zeid - TMH publications

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

Semester	: B.E. IV Semester	Branch	: Mechanical Engg., Mechatronics Engg.
Sub	: Mechanical Measurements and Metrology	Code	: 337415 (37)
Total Theory Periods	: 40	Total Tutorial Periods	: 10
Total Marks in End Semester Exam : 80			

Minimum number of class tests to be conducted : 02

UNIT - I

Generalized Measurement System

Introduction - Introduction to measurement and measuring instruments, Generalized measuring system and functional elements, units of measurement, static and dynamic performance characteristics of measurement devices, calibration, concept of error, sources of error, statistical analysis of errors sensors and Transducers – Types of sensors, type of transducers and their characteristics.

UNIT - II

Measurement

Measurement of displacement and angular velocity. Measurement of pressure: Gravitational direct acting, elastic and indirect type pressure transducers. Measurement of very low pressure – Mcleod gauge and Pirani gauge.

Measurement of Strain

Type of strain gauges and their working, strain gauge circuits, Mcleod gauge, Pirani gauge, temperature compensation. Strain rosettes. Measurement of force and torque. Measurement of temperature by thermometers, bimetallic, thermocouples, thermistors and pyrometers-total radiation and optical pyrometry.

UNIT- III

Measurement of flow

Obstruction meters, variable head meters, hot wire and magnetic meters, ultrasonic flow meters. Vibration and noise measurement : Seismic instruments, vibration pick ups and decibel meters.

Data acquisition system

Introduction to data acquisition systems, single and multi channel systems, microprocessors and PC based data acquisition systems. Input – output devices signal transmission and Processing. Devices and systems.

UNIT- IV

Metrology

Standards of measurement. Linear and angular measurement devices and systems limit gauges, gauge blocks. Measurement of geometric forms like straightness, flatness, roundness and circularity, principles and application of optical projectors, tool makers, microscope, autocollimators etc.

UNIT- V

Metrology

Principle and use of interferometry. Comparators, Measurement of screw threads and gears. Surface texture measurement.

TEXT BOOKS

1. Mechanical Measurements and Control – D.S. Kumar – S.K. Kataria & Sons
2. Mechanical Measurements – G. Beckwith Thomas G. – Pearson Education

REFERENCES BOOKS

1. Measurement Systems, Application Design – E.O. Deoblein - McGraw Hill
2. Engineering Metrology – K.J. Hume - MacDonald and Company
3. Engineering Metrology – I.C. Gupta - Dhanpat Rai & Sons
4. Mechanical & Industrial Measurements – R.K. Jain – Khanna Publishers

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

Semester : **B.E. IV Sem.**

Subject: **Thermal Engineering**

Total Theory Periods: **40**

Total Marks in End Semester Examination: **80**

Minimum number of Class tests to be conducted: **Two**

Branch: **Mechatronics Engg.**

Code: 367411(37)

Total Tutorial Periods: **10**

Unit-I

Vapour and Vapour Power Cycle

(a) **Vapour:** Properties and processes in ideal vapour, use of steam tables and Mollier's diagram in determination of steam properties, energy and entropy calculations.

(b) **Vapour Power Cycle:** 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-II

Steam Turbines

Steam turbine – Principal of operation of steam turbine, types, impulse turbine compounding of steam turbine, pressure compounded, velocity compounded and pressure – velocity compounded impulse turbine.

Velocity diagram for impulse turbine, force on the blade and work done.

Unit-III 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-IV Gas Turbine cycles

Classification of gas turbine. Simple open cycle gas turbine Ideal and actual cycle (Brayton Cycle) for gas turbine Optimum pressure ratio for maximum specific output in actual gas turbine Regeneration, reheat and inter cooling and effect of these modification on efficiency and output, closed cycle gas turbine.

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 – By R. Yadav - Central Publishing House, Allahabad
2. Non-Conventional Energy Sources - G.D. Rai – Khanna Publishers
3. Engineering Thermodynamics – P.K. Nag – TMH Publishers
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
2. Gas Turbine – V. Ganeshan – TMH
3. Thermal Science & Engineering – D.S. Kumar – S.K. Kataria & Sons

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

Semester : B.E. IV Semester Branch : Mechanical Engg., Mechatronics Engg.
Sub : Kinematics of Machines Code : 337414 (37)
Total Theory Periods : 40 Total Tutorial Periods : 10
Total Marks in End Semester Exam : 80

Minimum number of class tests to be conducted : 02

UNIT- I

Relative Velocity

Elements, pairs, mechanisms, four bar chain and its inversions, velocity diagrams, Relative velocity method, instantaneous center method.

UNIT- II

Relative Acceleration

Synthesis of Mechanism, pantograph, lower pair mechanisms, relative acceleration diagram, Klien'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 and gear trains

Gear terminology, law of gearing, gear tooth forms, standard involute and cycloid tooth profile, interference and undercutting of involute teeth, minimum number of teeth on pinion to avoid interference, types of gears

Gear trains

Simple, compound, reverted, and epicyclical gear trains, tabular/analytical/graphical/vector method for computation of velocity ratio in gear trains

UNIT-V

Friction

Friction in turning pairs, application of friction circles in slider crank and four bar mechanisms; pivot and collar friction, thrust bearings.

Brakes and Dynamometers

Simple block and shoe brake, band brake, band and block brake, and internal expanding shoe brake; absorption dynamometers, transmission dynamometers.

TEXT BOOKS

1. Theory of Machine- S.S.Rattan - TMH.
2. Theory of Machine – P.L. Ballaney – Khanna Publishers
3. Theory of Machines – J. E. Shigley – McGraw Hill

REFERENCE BOOKS

1. Theory of Mechanisms and Machines- A. Ghosh, A. K. Mallik – EWP Press
2. The Theory of Machines - Thomas Bevan, - CBS Publishers
3. Mechanisms and Machine Theory - J. S. Rao, R. V. Dukupati - Wiley Eastern Limited.

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

Semester : **B.E. IV Sem.**

Branch: **Electronics & Telecommunication,
Mechatronics**

Subject: **Analog Electronic Circuits**

Code: **328413 (28)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Total Marks in End Semester Examination: **80**

Minimum number of Class tests to be conducted: **Two**

UNIT-I

LOW FREQUENCY TRANSISTOR AMPLIFIER: Graphical Analysis of CE amplifier; h-parameter Models for CB, CE, CC configurations and their Interrelationship; Analysis and Comparison of the three Configurations; Linear analysis of Transistor Circuits: Miller's Theorem: Cascading: Simplified Models and Calculation of CE and CC Amplifiers; Effect of emitter Resistance in CE amplifiers: Cascode amplifiers: Darlington Pair, analysis of Single stage FET amplifier-CS and CD Configuration, FET as VVR.

UNIT-II

HIGH FREQUENCY TRANSISTOR AMPLIFIERS: CE hybrid- π model: Validity and parameter Variation: Current Gain with Resistive load: frequency response of a single stage CE Amplifier: Gain-Bandwidth product: CC stage High frequencies: Multistage Amplifiers: sources of Noise in Transistor Circuits; Noise Figure.

UNIT-III

MULTISTAGE AMPLIFIERS: Classification: Distortion in Amplifiers: Frequency Response: Bode plots: Step Response: pass band of Cascaded Stages: Response of a Two-stage RC Coupled Amplifier at Low and high frequencies: Multistage amplifiers: Sources of Noise in Transistor Circuits: Noise Figure.

UNIT-IV

FEEDBACK AMPLIFIERS: Classification: Feedback concept; Ideal Feedback amplifier: Properties of Negative Feedback Amplifier Topologies: Method of Analysis of Feedback amplifiers: Voltage series Feedback: Voltage series Feedback pair: Current series, Current shunt and Voltage shunt feedback; Effect of feedback on amplifier Bandwidth and stability.

UNIT-V

OSCILLATOR: Sinusoidal oscillator: phase shift oscillators, Wien Bridge oscillator: Resonant circuit oscillators: LC Collpit & LC Hartley, Amplitude Frequency and phase stability analysis of all Oscillators, General form of Oscillator Configuration; Crystal oscillator.

TEXT BOOKS:

1. Integrated Electronics – Millman & Halkias, TMH.
2. Microelectronics – Millman and Grabel, TMH.

REFERENCE BOOKS:

1. Electronic Devices & Circuits – David A. Bell, PHI

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

Semester: **B.E. IV Sem.**

Branch: **Electronics & Telecom., Applied
Electronics and Instrumentation,
Mechatronics**

Subject: **Mathematics-IV**

Code: **328411(14)**

Total Theory Periods: **30**

Total Tutorial Periods: **10**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **02**

UNIT - 1 SERIES SOLUTION OF DIFFERENTIAL EQUATIONS AND SPECIAL FUNCTIONS

Series solution of differential equations, The method of Frobenius, Bessel's differential equation, Bessel's function of the First Kind - recurrence relations, generating function, orthogonality, Legendre's differential equation, Legendre's polynomial - Rodrigue's formula, generating function, recurrence relations, orthogonality.

UNIT - 2 PARTIAL DIFFERENTIAL EQUATIONS:

Formation, Solution of Lagrange's linear differential equation, homogeneous linear differential equation with constant coefficients, non-homogeneous linear differential equations, Method of separation of variables.

UNIT - 3 APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

Initial & boundary value problems, Vibrations of a stretched string, D'Alembert's solution, One-dimensional heat flow, Transmission of signals along a cable - Telephone equation, Telegraph & radio equations, Vibrations of rectangular & circular membranes.

UNIT - 4 Z - TRANSFORM

Sequence, Basic operations on sequences, Definition of Z- Transform, Linearity, Change of scale & shifting properties, Z-transform of standard sequences, Inverse Z- Transform, Multiplication by n & division by n, Initial value & final value theorems, Convolution of sequences, Convolution theorem, Inverse Z- transform by partial fraction, power series and residue methods. Application to solution of difference equations.

UNIT - 5 RANDOM VARIABLE & PROBABILITY DISTRIBUTIONS

Random variable, Discrete & continuous probability distributions, Mathematical Expectation, Mean & variance, Moments & moment generating function, Probability distributions -Binomial, Poisson & Normal distributions.

TEXT BOOKS: -

1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

REFERENCE BOOKS: -

1. Advanced Engg. Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N. Wartikar & J.N. Wartikar. Vol- II– Pune Vidyarthi Griha Prakashan, Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

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

Semester : B.E. Fourth Semester Branch : Mechanical Engg.
 Mechatronics Engg.
 Sub : Mechanical Measurements & Metrology Lab Practical : 337424 (37)
 Code
 Total Practical Periods : 20
 Total Marks in End Semester Exam : 40

EXPERIMENTS TO BE PERFORMED

MEASUREMENT LAB TO BE PERFORMED (MINIMUM 7 NUMBERS)

1. To Measure Pressure Using Bourdon Pressure Gauge.
2. To Calibrate Pressure Gauge Using Dead Weight Pressure Gauge Tester.
3. To Measure Displacement Using LVDT
4. To Measure Temperature Using Thermister
5. To Measure Flow Rate Using Rotameter.
6. To Measure Angle Using Angular Sensor.
7. To Measure Torque Using Torque Transducer
8. To Measure Pressure Using Pressure Transducer.
9. To Measure Strain Using Strain Cantilever Beam.
10. To Measure Temperature Using RTD.
11. To Measure Temperature Using Thermo Couple.
12. To perform the following experiments using Data Acquisition System
 - a) To measure Temperature by Thermocouple
 - b) To measure Temperature by Thermistor
 - c) To measure Temperature by RTD.
 - d) To measure Strain.

METROLOGY LAB TO BE PERFORMED (MINIMUM 5 NUMBERS)

1. Measurements of lengths, heights, diameter by Vernier Calipers, Vernier Height Gauge, Micrometers.
2. Measurement of various angles using Bevel Protractor, Sine Bar & Combination Set.
3. Determining the accuracy of Electrical and Optical Comparator.
4. Determine the Surface Flatness and Contour using Interferometer.
5. Determine the Effective Diameter of screw threads by using Two wire & Three wire methods.
6. Measurement of Gear Elements using Profile Projector and image analyzer.
7. Measurement of Tool Angles of a Single Point Cutting Tool by using Tool Makers Microscope.
8. Calibration of Vernier Caliper, Micrometer, Height Gauge, Depth Micrometer using Slip Gauges.

LIST OF EQUIPMENTS/MACHINES REQUIRED

MEASUREMENT	METROLOGY
1. Data Acquisition System	1. Vernier Calipers
2. Software compatible with DAS	2. Vernier Height Gauge
3. Displacement Measurement Tutor Using (LVDT)	3. Depth Micrometers
4. Pressure Measurement Tutor Using Pressure Transducer	4. Set of Slip Gauges
5. Strain Measurement Tutor Using Strain Cantilever Beam	5. Interferometer
6. Torque Measurement Tutor Using Torque Transducer	6. Tool Makers Microscope
7. Temperature Measurement Tutor Using RTD Sensor	7. Profile Projector
8. Temperature Measurement Tutor Using Thermocouple	8. Bevel Protector
9. Temperature Measurement Tutor Using Thermister	9. Sine Bar
10. Angular Measurement Tutor Using Angular Sensor	10. Combination Set
11. Rotameter Trainer Module	11. Optical & Electrical Comparator
12. Dead Weight Pressure Gauge Tester	12. Optical Flats
13. Bourdon Gauge Trainer	13. Surface Plates
14. Image Analyzer	14. Dial Indicators
	15. Snap and Ring Gauges (GO and NO-GO type)

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

Semester : **B.E. IV Sem.**

Branch: **Electronics & Telecommunication,
Mechatronics**

Subject: **Analog Electronic Circuits Lab**

Code: **328421 (28)**

Total Practical Periods: **36**

Total Marks in End Semester Examination: **40**

Experiments to be performed: (minimum 10 experiments)

1. Static input characteristics curves of CE transistor.
2. Static out put characteristic curve CE transistor.
3. Static input characteristic curve of CB transistor.
4. Static output characteristic curve of CB transistor.
5. To design and study the frequency response of single stage CE transistor amplifier.
6. To study the frequency response of RC coupled double stage CE transistor amplifier.
7. To study the frequency response of RC coupled double stage CE transistor amplifier with voltage feedback.
8. To study the frequency response of RC coupled double stage CE transistor amplifier with current feedback.
9. To plot the voltage gain vs. load characteristics of common collector (emitter follower) n-p-n transistor.
10. To study Wein Bridge Oscillator.
11. Experiment with emitter follower a voltage series feed back amplifier.
12. General study of pushpull audio power amplifier.
13. To study RC phase shift oscillator.
14. Study of various topologies of feedback amplifier.
15. Experiment with Darlington pair amplifier.

List of Equipments/Machine Required:

Circuit components, Power supply, CRO, Function generator, Multimeter, Breadboard.

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

Semester : B.E. IV Semester Branch : Mechanical Engg.,
Mechatronics Engg.
Sub : Kinematics of Machines Lab Practical : 337423 (37)
Code
Total Practical Periods : 20
Total Marks in End Semester Exam : 40

EXPERIMENTS TO BE PERFORMED (MINIMUM TEN NUMBERS)

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. 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 EQUIPMENTS/MACHINES REQUIRED

1. Cam analysis apparatus
2. Journal bearing apparatus.
3. Corioli's component of acceleration apparatus
4. Slip & Creep Measurement Apparatus In Belt Drive
5. Simple, compound, reverted and epicyclic gear train apparatus.
6. Pantograph apparatus (with all accessories)
7. Internal / External shoe brake (complete set with accessories)
8. Four bar mechanism and its inversions.
9. Rope brake dynamometer apparatus (with all accessories)
10. Mechanoset.

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

Semester : **B.E. IV Sem.**

Subject : **HEALTH, HYGIENE & YOGA**

No. of Periods : 2 pds/week

Total Marks in End Semester Exam. : NIL

Minimum number of class tests to be conducted: Two

Branch: Common for all branches

Code : 328424 (28)

Tutorial Periods : NIL

Teacher's Assessment: 40 Marks

UNIT- I

HEALTH & HYGIENE: Concept of health, Physical health and mental health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and under-eating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food v/s nutritious food; fruits, vegetables cereals and qualities of each of these.

UNIT- II

INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE: History, development, basic concepts, modes of operation of Alopathy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accupressure, Accupuncture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

UNIT- III

YOGASANS: Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra,

UNIT- IV

YOGASANS FOR COMMON DISEASES: From Yogic Materia Medica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomach disorders, such as, indigestion, acidity, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:** Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain :** Shirsh padasan, Shashankasan.
- **Asans for eye sight:** Tratak, Neti Kriya .
- **Pranayam :** Definition and types : Nadi Shodhan, Bhastrik, Shitakari, Bhramari useful for students.

UNIT V

CONCENTRATION: Concentration of mind and how to achieve it. Tratak ¼=kVd½] Concentration on breath, Japa ¼ti½] Ajapajap ¼vtiki½] internal silence ¼vUrekSZu½] visualization in mental sky ¼fnpkdk'k /kkj.kk½] Concentration on point of light ¼T;ksfr /;ku½] Concentration on feeling ¼Hkko /;ku½] Concentration on figure ¼ewÜkZ /;ku½-

REFERENCES

- (1) Yogic Materia Medica
- (2) Asan, Pranayam and Bandh