

Chhattisgarh Swami Vivekanand Technical University, Bhilai

SCHEME OF TEACHING & EXAMINATION

BE (Civil Engineering) IV Semester

Sl.No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Exam Theory/Practical			Total Marks	Credit L+(T+P)/ 2
				L	T	P	ESE	CT	TA		
1	Civil Engg.	320451 (20)	Structural Analysis I	4	1		80	20	20	120	5
2	Civil Engg.	320452 (20)	Fluid Mechanics II	4	1		80	20	20	120	5
3	Civil Engg.	320453 (20)	Surveying II	3	1		80	20	20	120	4
4	Civil Engg.	320454 (20)	Civil Engineering Drawing	1	3		80	20	20	120	4
5	Civil Engg.	320455 (20)	Building Construction	3	1		80	20	20	120	4
6	Civil Engg.	320456 (20)	Transportation Engineering-1	2	1		80	20	20	120	3
7	Civil Engg.	320461 (20)	Fluid Mechanics II Lab			3	40		20	60	2
8	Civil Engg.	320462 (20)	Surveying Field Work II			3	40		20	60	2
9	Civil Engg.	320463 (20)	Civil Engineering Drawing			3	40		20	60	2
10	Civil Engg.	320464 (20)	Transportation Engineering-1-lab			3	40		20	60	2
11	Humanities	320465 (46)	Health, Hygiene & Yoga			2			40	40	1
12			Library			1					
			Total	17	8	15	640	120	240	1000	34

L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment

Note (1): Duration of all theory papers will be of Three Hours except 'Civil Engineering Drawing' at Sl. No. 4 which will be of Four Hours' duration.

Note (2): Industrial Training of six 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.

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Name of program:	Bachelor of Engineering	Semester:	IV
Branch:	Civil Engineering	Code:	320451 (20)
Subject:	Structural Analysis – I	Total Tutorial Periods:	10
Total Theory Periods:	40	Assignments:	Two (Minimum)
Class Tests:	Two (Minimum)	Maximum Marks: 80	Minimum Marks: 28
ESE Duration:	Three Hours		

Course Objectives:

1. Make student to understand between Determinate and Indeterminate structures.
2. To understand the methods to analyse slopes and deflections of structures.
3. To understand the method of Strain Energy to analyse deflections of structures.
4. To provide an understanding about loads position variation on structures and corresponding analysis by rolling loads and ILDs.
5. To understand behaviour of suspension bridges, cables and Arches.

UNIT- I Determinate Structures- Determinate vs. Indeterminate structures, static indeterminacy, External and internal indeterminacy, rules for determining degree of indeterminacy, Degree of Freedom Per Node, Kinematic Indeterminacy. Pin Jointed determinate space trusses, distinction between determinate and indeterminate spacetrusses and simple and complex space trusses, Analysis of simple and determinate space trusses. Method of Substitution and Method of tension coefficient.

UNIT-II Deflection and Slope - Moment curvature relation, The elastic curve, Relation between Loading, SF, BM, Slope and Deflection, Deflection and slopes of statically determinate beams by Double integration method, Macaulay's method, Area moment method. Basics of Conjugate beam method.

UNIT- III Strain Energy- Strain energy due to axial load, bending, shear and torsion, Castigliano's theorem for deflection, Betti's theorem - Maxwell's law of reciprocal deflections, unit load and strain energy method for determination of deflections of statically determinate beams - pin-jointed trusses and rigid frames.

UNIT-IV Rolling Loads & Influence Lines- Introduction to Rolling loads - concept of influence lines - influence lines for reaction, shear force and bending moment in simply supported beams - influence lines for forces in trusses – analysis for different types of rolling loads - single concentrated load - several concentrated loads - uniformly distributed load shorter and longer than the span, Absolute maximum bending moment.

UNIT-V Cables, suspension bridges & arches Analysis of forces in cables with concentrated and continuous loadings - suspension bridges with three-hinged and two-hinged stiffening girders, Theory of arches - Eddy's theorem - analysis of three-hinged and two-hinged arches.

Text Books:

1. Basic Structural Analysis (Vol. I & II) – Bhavikatti S.S. (Vikas Publishing)
2. Theory of Structures – B.C. Punmia (Laxmi Publication)

Reference Books:

1. Theory & Analysis of Structures (Vol. – I & II) – Jain, O.P. and Jain B.K. (Nem Chand)
2. Structural Analysis – R.C. Hibber (Pearson Publication)
3. Structural Analysis – Ghali, A. & Neville, M. (Chapman & Hall Publication. 1974)
4. Elementary Structural Analysis – Willbur and Norris (Tata McGraw Hill)
5. Structural Analysis – Negi L.S. & Jangid R.S. (Tata McGraw Hill)
6. Theory of Structures – Ramamurtham S. & Narayan R. (Dhanpat Rai Publications)

Course Outcomes:

1. Students are expected to understand various methods to analyse structures for slopes and deflections.
2. Students are expected to understand various types' determinate and indeterminate structures.
3. Students are expected to understand rolling effects of loads and Influence diagrams.
4. Students are expected to understand concept of bridges of suspension and arch types.

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Name of program:	Bachelor of Engineering	Semester:	IV
Branch:	Civil Engineering	Code:	320452 (20)
Subject:	Fluid Mechanics – II	Total Tutorial Periods:	10
Total Theory Periods:	40	Assignments:	Two (Minimum)
Class Tests:	Two (Minimum)	Maximum Marks: 80	Minimum Marks: 28
ESE Duration:	Three Hours		

Course Objectives:

1. Be familiar with different fluid flowing condition in pipe
2. Determination of hydraulic parameters affecting flow of fluids by various Methods.
3. Learning different effects of pipe flow and their respective analysis.
4. Be familiar with hydraulic machines which has extensive application in Water Supply Civil Engineering Construction projects.

UNIT- I Turbulent flow in pipe- Nature of turbulence, free and wall turbulence, turbulent flow in pipes, equation for velocity distribution over smooth and rough surfaces, energy and momentum correction factor, Resistance coefficient (Friction factor) and its variation, Colebrook-White equation, Moody's diagram, Explicit equation for friction factors, concept of equivalent length, pipes in series and parallel, Analysis of pipe network (Hardy-Cross method).

UNIT-II Boundary layer Analysis- Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, turbulent boundary layer, and laminar sub layer, Application of momentum equation, local and average friction coefficient. Fluid flow past submerged bodies Drag and lift, drag on sphere, cylinder and disc, Magnus effect.

UNIT- III Non-uniform flow in open channel - Specific energy, critical flow, analysis of flow over hump and transition, broad crested weir, equation of gradually varied flow, hydraulic jump and evaluation of its elements in rectangular channel.

UNIT-IV Compressibility effect in pipe flow -Transmission of pressure waves in rigid and elastic pipes, water hammer, **Dimensional analysis and Hydraulic similitude** Dimensional analysis, Buckingham's theorem, important dimensionless numbers and their significances, geometric, kinematics and dynamic similarity, model study.

UNIT-V Hydraulic Machines - Turbines: Classification of turbines, draft tube, specific speed, unit quantities, and characteristics curves of turbines, and governing of turbine. **Pump:** Classification of pumps, types, efficiencies, specific speed, selection, cavitations, characteristic curves.

Text Books:

1. Fluid Mechanics and Machines – Dr. A.K. Jain (Khanna Publications)
2. Fluid Mechanics and Machines – Dr. R.K. Bansal (Laxmi Publications)
3. Fluid Mechanics – Dr. P.N. Modi (Standard Book House)

Reference Books:

1. Mechanics of Fluid – Irving H. Shames (McGraw Hill)
2. Introduction to Fluid Mechanics – James A. Fay (Prentice Hall India)
3. Fluid Machines – Dr. JagdishLal (Metropolitan Book Company Private Ltd.)

Course Outcome:

1. Students are expected to find turbulence flow in pipe .
2. Students are expected to analyse flow of fluids in pipe network.
3. Students are expected to understand & evaluate flow in open channel.
4. Students are expected to understand & analyse transmission of pressure waves. .
5. Students are expected to learn hydraulic properties of Turbine & Pumps.

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Name of program:	Bachelor of Engineering	Semester:	IV
Branch:	Civil Engineering	Code:	320453 (20)
Subject:	Surveying – II	Total Tutorial Periods:	10
Total Theory Periods:	40	Assignments:	Two (Minimum)
Class Tests:	Two (Minimum)	Maximum Marks: 80	Minimum Marks: 28
ESE Duration:	Three Hours		

Course Objectives:

1. To be familiar with various aspects of Trilateration and Triangulation
2. To deal with the relevant computations, errors and observations.
3. To gain the knowledge of Tacheometry, various systems, instruments etc.
4. To learn the concepts of Photographic and aerial surveying.
5. To learn and apply the concept of Hydrographic surveying.

UNIT- I Trilateration and Triangulation - Principle of Trilateration, Reduction of observation, Principle and classification of Triangulation System, Triangulation chains, Strength of Figures, Station marks and Signals, Satellite station, intersected and Resected points, field work- Reconnaissance, Intervisibility of station, Angular measurement, Base line measurement and its extension, Adjustment of Field observation and computation of co-ordinates.

UNIT-II Adjustment Computations -Weighting of observations. Treatment of random errors, probability equation, Normal law of error, Most Probable Value, Propagation of errors and variances. Most probable value, Principle of Least square, Observations and correlative Normal Equations. Adjustment triangulation figures and level nets.

UNIT- III Tacheometry-Definitions, Principles of stadia systems. Instrument constants, Subtense and Tangential Systems. Construction and use of Reduction Tacheometers, Range Finders, EDM instruments, Total Station and their uses. Study of Laser Distance Meter.

UNIT-IV Photographic and aerial surveying -Photo theodolite, principle of the method of terrestrial photogrammetry, stereo photogrammetry, aerial surveying, scale and distortion of the vertical and tilted photograph, comparison between air photograph and map, Study of GPS, GIS and Remote Sensing.

UNIT-V Hydrographic surveying -Introduction, shore line survey, soundings methods, gauges, equipment required for hydrographic surveying, sounding party, methods of locating soundings, reduction of soundings and plotting of soundings, problems related to hydrographic surveying.

Text Books:

1. Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)
2. Surveying (Vol. II & III) – Agor, R (Khanna publications, Delhi, 1995)

Reference Books:

1. Engineering Surveying Technology – Kennie, T.J.M. and Petrie G. (Blackie & Sons Pvt. Ltd., London, 1990)
2. Surveying (Vol. II & III) – Arora, K.R. (Standard Book House, Delhi, 1993)
3. Solving Problems in Surveying – Bannister A. and Baker, R. (Longman Scientific Technical, U.K., 1994)
4. Surveying (Vol. I & II) – Kanetkar T.P. (Pune Vidyarthi GrihaPrakashan, Pune)
5. Surveying (Vol. I & II) – C Venkataramaih (Universities Press Hyderabad)

Course Outcomes:

Students will be able to:

1. Deal with the various aspects of Trilateration and Triangulation
2. Do the relevant computations, errors and observations.
3. Gain and apply the knowledge of Tacheometry, various systems, instruments etc.
4. Apply the concepts of Photographic and aerial surveying.
5. Efficiently deal with the Hydrographic surveying.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	Bachelor of Engineering	Semester:	IV
Branch:	Civil Engineering	Code:	320454 (20)
Subject:	Civil Engineering Drawing	Total Tutorial Periods:	10
Total Theory Periods:	40	Assignments:	Two (Minimum)
Class Tests:	Two (Minimum)	Maximum Marks: 80	Minimum Marks: 28
ESE Duration:	Four Hours		

Course Objectives:

1. Make student to understand General Principles of planning.
2. To understand the drawing of plan of single, double story residential buildings
3. To understand the Drawing of section of single and double story residential buildings
4. To provide an understanding drawing of elevation of building
5. To understand detailing of flush shutter, panelled shutter etc

UNIT- I **General Principles of planning** - Aspects, Prospects, Circulation, Grouping, Roominess, Economy, Elegance, Furniture requirements, flexibility, Privacy. Site selection and requirements of different public buildings such as hospitals, schools, hostels using line plan. Municipal regulations and bye-laws for residential buildings.

UNIT-II Drawing of plan of single and double story residential buildings.

UNIT- III Drawing of elevation and section of single and double story residential buildings.

UNIT-IV Single line plan of hostel, primary health centre, school canteen.

UNIT-V Detailing of flush shutter, panelled shutter, fully glazed, half glazed, half glazed and half paneled doors and windows, elements of perspective, example on simple blocks.

Text Books:

1. A course in Civil Engineering Drawing – V.B. Sikka (Katson Technical Publications)
2. Civil Engineering Drawing – Shah, Kala and Patki (Tata McGraw Hill)

Reference Books:

1. A Textbook of Civil Engineering Drawing: Buildings – R.P. Chandel (Katson Technical Publications)
2. Planning and Designing Buildings – Y.S. Sane (Allies Book Stall and Engineering Book Publishing Co.)
3. Hospitals: Planning, Design and Management – Kunders, Gopinath & Ashoka Katakam (Tata McGraw Hill)
4. A Book of Home Plans – D. N. Ghose (CBS Publishers and Distributors)

Course Outcomes:

1. Students are expected to understand various methods of general principles of planning.
2. Students are expected to understand drawing plan of single, double story residential buildings
3. Students are expected to understand drawing of elevation of single & double story buildings

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Name of program:	Bachelor of Engineering	Semester:	IV
Branch:	Civil Engineering	Code:	320455 (20)
Subject:	Building Construction	Total Tutorial Periods:	10
Total Theory Periods:	40	Assignments:	Two (Minimum)
Class Tests:	Two (Minimum)	Maximum Marks: 80	Minimum Marks: 28
ESE Duration:	Three Hours		

Course Objectives:

1. Make student to understand various parts of building.
2. Make student to understand foundations of structures.
3. To understand the safety precautions & sound proofing.
4. To prepare a base for Civil Engineering Drawing.
5. To provide an understanding about the relevance and application in Civil Engineering Projects.

- UNIT- I Foundations** - Brief study of different types of foundations, nature of soil (expansive or non-expansive, alluvial or residual, sandy or clayey for settlement etc.), approximate values of bearing capacities, breadth and depth of foundation, typical cross sections for foundations under walls and R.C.C. Columns. Foundations in black cotton soils, under reamed pile foundations, foundation failures and remedial measures.
- UNIT-II Masonry** - Technical terms in masonry, classification and brief specifications of stone masonry, bonds in brick masonry, general principles to be observed in stone and Brick Masonry Construction. Walls Different types (load bearing, cavity-walls and partition walls), thickness considerations. Doors, Windows And Lintels Different types based on materials and methods of construction, technical terms, size and locations.
- UNIT- III Floors** - Ground and upper floors, various types, their suitability, construction details of concrete and terrazzo floors, Floor tiles. **Roofs** -Technical terms and different types of pitched and flat roofs. Various roof coverings for pitched and flat roofs. **Ceiling** – Purpose & types of ceiling. Formwork -Different types of formwork, stripping times.
- UNIT-IV Damp Proofing** Causes and effect of Dampness, parts of a building likely to be affected most, methods of dampproofing in different locations including roofs. **Plastering and Pointing** -Types and considerations during plastering and pointing. **Joints**- Construction Contraction and Expansion Joints.
- UNIT-V Stairs** Types based on geometry and material, suitability, proportioning of stairs, lifts and escalators. **Sound Proofing**- Materials and Methods of sound proof construction. Safety Precautions- Safe Practices, Basic First Aid Procedures Construction Teams, Light Construction and Heavy Construction Ceiling, Balcony - Functions, Method of construction

Text Books:

1. Building Construction – B.C. Punmia (Laxmi Publication Pvt. Ltd.),,
2. Building Construction – Sushil Kumar (Standard Publication Distributors)

Reference Books:

1. Building Construction – Gurucharan Singh (Standard Publication Distributors)
2. Building Construction – S. C. Rangwala (Charotar Publishing House, Anand, Gujarat)

Course Outcome:

1. Students are expected to understand various parts of building.
2. Students are expected to understand various types of bonds.
3. Students are expected to read construction drawing of form work.
4. Students are expected to understand importance of safety in construction.

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Name of program:	Bachelor of Engineering	Semester:	IV
Branch:	Civil Engineering	Code:	320456 (20)
Subject:	Transportation Engineering – I	Total Tutorial Periods:	10
Total Theory Periods:	40	Assignments:	Two (Minimum)
Class Tests:	Two (Minimum)	Maximum Marks: 80	Minimum Marks: 28
ESE Duration:	Three Hours		

Course Objectives:

1. Be familiar with principles of Highway planning & Geometric design.
2. Fundamental Concepts of Traffic Engineering.
3. Learning different highway materials & their testing.
4. Learning pavement design & its Construction.
5. Learning different aspect of Airport planning.

- UNIT- I** Principal of Highway Planning- Road development and planning in India Highway alignment, requirements. Engineering Surveys for highway location Maps and Drawing. Elements of Transportation Engineering (Vehicle, Driver, Terminal and Control).Geometric Design:Cross Section elements of horizontal and vertical Alignment. Highway drainage, Surface and subsoil drainage. Geometry of Hill Roads, curve layout.
- UNIT-II** Traffic Engineering- Introduction to Traffic flow theory speed-density, speed-flow and flow-density relation, data collection techniques for traffic parameters and delay studies, parking facilities, etc. and their uses. Traffic control. Devices, Prevention of road accidents, rotary intersection, highway lighting,Highway materials: Behavior of highway materials, properties of Sub grade and pavement component materials. Tests on sub grade soil, Aggregate and bituminous materials.
- UNIT- III** Pavement Design - Study of flexible and rigid pavements, Basic concepts of pavement analysis and design. Stresses in rigid pavements. I.R.C. recommendations.
- UNIT-IV** **Pavement Construction Techniques and Quality Control** -Types of Pavements water bound macadam, bituminous and cement concrete pavements. Joints in cement concrete pavements, pavement failures. Modern materials in pavements.
- UNIT-V** Airport Planning - Definition of terms related to airport engineering, factors affecting site, selection, obstructions, various surveys for site selection, zoning laws. Classification of Obstructions Runways Orientation, Basic runway length and its corrections. Geometric design, runway configuration taxiways layout geometric, Standards, exit taxiways fillets separation.

Text Books:

1. Principle and Practices of Highway Engineering – Kadiyali (Khanna Publishers, Delhi)
2. Highway Engineering – S. K. Khanna& C.E.G. Justo (Khanna Publishers, Delhi)

Reference Books:

1. Air-port planning and Design – Khanna and Arora (Khanna Publishers, Delhi).
2. Highway Engineering – Rangawala S.C. (Charotar Publishers).
3. Specifications for Road and Bridge Works – MOST (IRC Publishers).
4. Manual for Survey, Investigation and Preparation of Road Projects – IRC Publication 2001.

Course Outcomes:

1. Students are expected to understand highway planning & design .
2. Students are expected to understand traffic Engineering.
3. Students are expected to understand & evaluate highway construction material.
4. Students are expected to develop exposure in pavement design.
5. Students are expected to learn airport planning.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Civil Engineering**

Subject: **Fluid Mechanics Laboratory – II Laboratory**

Total Lab Periods: **36**

Maximum Marks: **40**

Semester: **IV**

Code: **320461(20)**

Batch Size: **15**

Minimum **20**

Mark

s:

List of Experiments: (At least Ten experiments are to be performed by each student)

1. To study the transition from laminar to turbulent flow and to determine the lower acritical Reynolds's number.
2. To study the velocity distribution in pipe and to compute the discharge by integrating Velocity profile
3. To study the variation of friction factor for pipe flow.
4. To determine the roughness coefficient of a open channel.
5. To determine the coefficient of discharge of a weir.
6. To determine the coefficient of discharge of a venturiflume.
7. Study of the hydraulic jump in a open channel.
8. To determine the coefficient of discharge of a spillway.
9. To study the performance characteristics of Pelton wheel turbine.
10. To study the performance characteristics of Francis turbine.
11. To study the performance characteristics of Kaplan turbine.
12. To study the performance characteristics of variable speed centrifugal pump.
13. To study the performance characteristics of rated speed centrifugal pump.
14. To study the performance characteristics of multistage pump.
15. To study the performance characteristics of reciprocating pump.

Equipment/Machines/Instruments/Tools/Software Required:

- Pipe Flow Apparatus
- Tilting Flume
- Pelton Wheel Turbine
- Francis Turbine
- Kaplan Turbine
- Variable Speed Centrifugal Pump
- Rated Speed Pump
- Multistage Pump
- Reciprocating Pump

Recommended Books:

1. Hydraulics Laboratory Manual – S.K. Likhi (New Age International Ltd.)
2. Fluid Mechanics – JagdishLal (Metropolitan Educational, New Delhi)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Civil Engineering**

Semester: **IV**

Subject: **Surveying Field Work – II**

Code: **320462(20)**

Total Lab Periods: **36**

Batch Size: **15**

Maximum Marks: **40**

Minimum Marks: **20**

List of Experiments: (At least Ten experiments are to be performed by each student)

1. To perform the experiment for reduction to centre from different positions of a satellite station when: (i) Satellite station in north position, (ii) Satellite station in left position.
2. To perform the experiment for reduction to centre from different positions of a satellite station when: (i) Satellite station in south position, (ii) Satellite station in right position.
3. To find the most probable value of angle for combined triangle by method of difference.
4. To find the most probable value of triangles of a quadrilateral shapes by method of correlates.
5. To find the most probable value of triangles by the method of Gauss rule.
6. Adjustment of two connected triangles.
7. Adjustment of quadrilateral by method of least square.
8. Adjustment of geodetic triangles with central station by method of least square.
9. Determination of Tacheometric constants.
10. Determination of elevation and distance when line of sight inclined upward.
11. Determination of elevation and distance when line of sight inclined downward.
12. Determination of elevation and height by tangential method when both angles are angles of elevation.
13. Study of Electronic Digital Theodolite.
14. Study of Total Station.
15. Study of Auto level.
16. Measurement of sides of a triangle using Laser Distance Meter.

Equipment/Machines/Instruments/Tools/Software Required:

- Metric Chain (30 m)
- Tape (15m, 30 m)
- Ranging Rod (2m, 3m)
- Plumb bob
- Arrows
- Theodolite
- Electronic Digital Theodolite
- Auto level
- Total Station
- Leveling Staff (Folding and Non-folding)
- Wooden Pegs
- Cross Staff
- Laser Distance Meter.

Recommended Books:

1. Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)
2. Surveying (Vol. I & II) – Kanetkar T.P. (Pune VidyarthiGrihaPrakashan, Pune)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Civil Engineering**

Subject: **Transportation Engineering – I Laboratory**

Total Lab Periods: **36**

Maximum Marks: **40**

Semester: **IV**

Code: **320464(20)**

Batch Size: **15**

Minimum Marks: **20**

List of Experiments: (At least Ten experiments are to be performed by each student)

1. Determination of crushing value of aggregates.
2. To determine 10 percent finer value.
3. Determination of abrasion value by Los Angle's Machine.
4. Determination of abrasion value by Deval's Abrasion Machine.
5. Determination of Impact Value of aggregates.
6. Determination of Specific Gravity and Water Absorption of aggregate.
7. Determination of Softening Point of Bitumen.
8. Determination of Ductility Value of Bitumen.
9. Determination of Viscosity Value of Bitumen.
10. Determination of Elongation Index of Aggregate.
11. Determination of Flakiness Index of aggregate.
12. Determination of Penetration Value of Bitumen.
13. Flash and Fire Point Test.
14. Study of Marshal Stability Test.
15. Study of Benkelman Beam.
16. Determination of Angularity number of aggregate.

Equipment/Machines/Instruments/Tools/Software Required:

- Ring and Ball Apparatus
- Standard Penetrometer
- Los Angles Abrasion Machine
- Deval's Abrasion Machine
- Ductility Testing Machine
- Tar Viscometer
- Sieve Shaker
- Standard I.S. Sieves for Fine and Coarse Aggregate
- Length Gauge
- Thickness Gauge
- Crushing Value Cylinder and Mould with Plunger
- Aggregate Impact Testing Machine
- Flash and Fine Point Apparatus
- Benkelman Beam
- Hot Air Oven
- Water Bath
- Marshall Stability Machine and with Mould
- Proving Ring and Dial Gauge
- Weighing Balance up to 10 kg capacity

Recommended Books:

1. Highway Engineering – Justo &Khanna (Khanna Publishers)
2. Highway Engineering Manual – Justo &Khanna (Khanna Publishers)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Civil Engineering**
Subject: **Civil Engineering Drawing**
Total Lab Periods: **36**
Maximum Marks: **40**

Semester: **IV**
Code: **320463(20)**
Batch Size: **15**
Minimum Marks: **20**

List of Experiments: (At least Ten experiments are to be performed by each student)

1. Introduction to AutoCAD drafting package.
2. To draw the foundation details of internal and external walls.
3. To draw the single line plan of a residential building.
4. To draw the double line plan, elevation and section of single story residential building.
5. To draw the double line plan, elevation and section of double story residential building.
6. To draw the line plan of a primary school building.
7. To draw the line plan of a hostel building.
8. To draw the line plan of a hospital building.
9. To draw the plan and section of a fully furnished bathroom.
10. To draw the plan and section of a fully furnished kitchen.
11. To draw section and elevation of flush shutter, paneled shutter doors and windows.
12. To draw section and elevation of fully glazed, half glazed, half glazed and half paneled doors and windows.
13. To draw the perspective view of simple blocks and combination.

Equipment/Machines/Instruments/Tools/Software Required:

- PC system.
- AutoCAD Software.

Recommended Books:

1. AutoCAD 2000 Complete – et. al. (BPB Publications)
2. An introduction to AutoCAD 2000 – A. Yarwood (Pearson Education)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Civil Engineering**
Subject: **Health, Hygiene & Yoga**

Semester: **IV**
Code: **320465(46)**

No. Of Periods: **2 Periods/Week**

Total Tutorial Periods: **NIL**

Maximum Marks: 40

Minimum Marks: 24

Course Objectives:

- 1 To provide understanding the importance of health.
- 2 To provide insight into the hygiene aspect & quality of life.
- 3 To study the concepts of various medical therapy.
- 4 To practice the various yogasans.
- 5 To provide knowledge about common diseases and its cure through yagasans and pranayam.
- 6 To develop concentration through various methods.

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 underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs 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, Accurpressure, 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 MateriaMedica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomache 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:**Shirshpadasan, Shashankasan.
- **Asans for eye sight:**Tratak, NetiKriya .
- **Pranayam:** Definition and types: NadiShodhan, Bhastrik, Shitakari, Bhramari useful for students.

UNIT-V CONCENTRATION: Concentration of mind and how to achieve it. Tratak (त्राटक). Concentration on breath, Japa (जप). Ajapajap (अजपाजप), internal silence (अन्तर्मान), visualization in mental sky (चिदाकाश धारणा), Concentration on point of light (ज्योति ध्यान), Concentration on feeling (भाव ध्यान), Concentration on figure (मूर्त्त ध्यान).

Text Books:

Health, Hygiene & Yoga, Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

Reference Books:

- (1) Yogic MateriaMedica
- (2) Asan, Pranayam and Bandh.