POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	DCEA- 401
Course Title	Advanced Surveying
Number of Credits	3 (L:3; T:0; P:0)

Course Objectives:

Following are the objectives of this course:
- To know methods of plane surveying and Theodolite surveying and their uses
- To learn tacheometric surveying and curve setting
- To understand the principles of Electronic Distance Measurement equipment and Total station and their use.
- To know the concept of remote sensing, GPS and GIS

Course outcomes:

After competing this course, student will be able to:
- Prepare plans using Plane Table Surveys.
- Prepare plans using Theodolite surveys.
- Find distances and elevations using Tachometer.
- Prepare plans using Total Station instrument.
- Locate coordinates of stations using GPS.

UNIT – I Plane Table Surveying

Principles of plane table survey. Accessories of plane table and their use, Telescopic alidade. Setting of plane table; Orientation of plane table - Back sighting and Magnetic meridian method, True Meridian Method. Methods of plane table surveys- Radiation, Intersection and Traversing. Merits and demerits of plane table survey.

UNIT – II Theodolite Surveying

Types and uses of Theodolite, Components of transit Theodolite and their functions, Reading the Vernier of transit Theodolite. Technical terms- Swinging, Transiting, Face left, Face right. Fundamental axes of transit Theodolite and their relationship. Temporary adjustment of transit Theodolite. Measurement of horizontal angle- Direct and Repetition method, Errors eliminated by method of repetition. Measurement of magnetic bearing of a line, Prolonging and ranging a line, deflection angle. Measurement of vertical Angle.

UNIT – III Tacheometric surveying and Curve setting

Principles of Tacheometry, Tacheometer and its component parts, Anallatic lens.Tacheometric formula for horizontal distance with telescope horizontal and staff vertical. Field method for determining constants of tacheometer, Determining horizontal and vertical distances with tacheometer by fixed hair method and staff held vertical, Limitations of tacheometry. Types of curves used in roads and railway alignments. Designation of curves.

UNIT – IV Advanced surveying equipments

Principle of Electronic Distance Meter (EDM), its component parts and their Functions, use of EDM. Use of Total Station, Use of function keys. Measurements of Horizontal angles, vertical angles, distances and coordinates using Total Station, Traversing, Profile Survey and Contouring with Total Station.

UNIT – V Remote sensing, GPS and GIS

Remote Sensing – Overview, Remote sensing system, Applications of remote sensing in Civil engineering, land use / Land cover, mapping, disaster management. Use of Global Positioning System (G.P.S.) instruments. Geographic Information System (GIS): Over view, Components, Applications, Software for GIS. Introduction to Drone Surveying.

Suggested learning resources:

1. Kanetkar, T. P.; Kulkarni, S. V., Surveying and Levelling Part I and II, Pune Vidyarthi Gruh Prakashan, Pune.
2. Basak, N. N.,Surveying and Levelling, McGraw Hill Education (India) Pvt. Ltd.,Noida.
3. Duggal, S. K., Survey I and Survey II, Tata McGraw Hill Education Pvt. Ltd., Noida.
4. Saikia, M D.; Das. B.M.; Das. M.M., Surveying PHI Learning Pvt. Ltd., New Delhi.
5. Subramanian, R., Surveying and Levelling, Oxford University Press. New Delhi.
6. Punmia, B.C,; Jain, Ashok Kumar; Jain, Arun Kumar, Surveying Vol. I and Surveying Vol. II, Laxmi Publications Pvt. Ltd., New Delhi.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content **SEMESTER- IV**

Course Code	**DCEA- 401**
Course Title	**Advanced Surveying**
Number of Credits	**1 (L:0; T:0; P:2)**

List of Practicals

1 Use plane table survey to prepare plans of a plot of seven sided closed traverse by Radiation Method.
2 Use plane table survey to prepare plans, locate details by Intersection Method.
3 Use plane table survey to prepare plans, locate details by Traversing Method.
4 Use plane table survey to carry out Survey Project for closed traverse for minimum five sides around a building.
5 Use transit theodolite to measure Horizontal and Vertical angle by Direct Method.
6 Plot the traverse on A1 size imperial drawing sheet for the collected data from preceding Theodolite Survey Project.
7 Use Thedolite as a Tacheometer to compute reduced levels and horizontal distances.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	**DCEA- 402**
Course Title	**Building Planning and Drawing**
Number of Credits	**3 (L:3; T:0; P:0)**

Course Objectives:

Following are the objectives of this course:
- To learn basic principles of building planning and drawing.
- To know graphical representation of various components of buildings.
- To draw complete plan and elevation of a building.
- To learn basics of perspective drawings and Computer Aided Drawings.

Course outcomes:

After competing this course, student will be able to:
- Interpret the symbols, signs and conventions from the given drawing.
- Prepare line plans of residential and public buildings using principles of planning.
- Prepare submission and working drawing for the given requirement of Load Bearing Structure.
- Prepare submission and working drawing using CAD for the given requirement of Framed Structure.
- Draw two-point perspective drawing for given small objects.

UNIT – I Conventions and Symbols

Conventions as per IS 962, symbols for different materials such as earthwork, brickwork, stonework, concrete , woodwork and glass. Graphical symbols for doors and windows, Abbreviations, symbols for sanitary and electrical installations. Types of lines-visible lines, centre line, hidden line, section line, dimension line, extension line, pointers, arrow head or dots. Appropriate size of lettering and numerals for titles, sub-titles, notes and dimensions. Types of scale- Monumental, Intimate, criteria for Proper Selection of scale for various types of drawing. Sizes of various standard papers/sheets.

UNIT – II Planning of Building

Principles of planning for Residential and Public building- Aspect, Prospect, Orientation, Grouping, Privacy, Elegance, Flexibility, Circulation, Furniture requirements, Sanitation, Economy. Space requirement and norms for minimum dimension of different units in the residential and public buildings as per IS 962.

Rules and bye-laws of sanctioning authorities for construction work. Plot area, built up area, super built up area, plinth area, carpet area, floor area and FAR (Floor Area Ratio). Line plans for residential building of minimum three rooms including water closet (WC), bath and staircase as per principles of planning. Line plans for public building- school building, primary health centre, restaurant, bank, post office, hostel, Function Hall and Library.

UNIT – III Drawing of Load Bearing Structure

Drawing of Single storey Load Bearing residential building (2 BHK) with staircase. Data drawing –plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement, Planning and design of staircase- Rise and Tread for residential and public building.

Working drawing – developed plan, elevation, section passing through staircase or WC and bath.

UNIT – IV Drawing of Framed Structure

Drawing of Two storeyed Framed Structure (G+1), residential building (2 BHK) with staircase. Data drawing – developed plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement. Planning and design of staircase**-** Rise and Tread for residential and public building. Working drawing of Framed Structure – developed plan, elevation, section passing through staircase or WC and bath. Foundation plan of Framed Structure. Details of RCC footing, Column, Beam, Chajjas, Lintel, Staircase and slab.
Drawing with CAD- Draw commands, modify commands, layer commands.

UNIT – V Perspective Drawing

Definition, Types of perspective, terms used in perspective drawing, principles used in perspective Drawing. Two Point Perspective of small objects only such as steps, monuments, pedestals.

Suggested learning resources:

1. Shah. M.G. Kale, CM, Patki, S.Y., Building Drawing, Mcgraw Hill Publishing company Ltd. New Delhi.
2. Malik and Mayo, Civil Engineering Drawing, Computech Publication Ltd New Asian Publishers, New Delhi.
3. M. G. Shah and C. M. Kale, Principles of Perspective Drawing, Mcgraw Hill Publishing company Ltd. New Delhi.
4. Swamy, Kumara; Rao, N, Kameshwara, A ., Building Planning and Drawing, Charotar Publication, Anand.
5. Bhavikatti, S. S., Building Construction, Vikas Publication House Pvt. Ltd., New Delhi.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content **SEMESTER- IV**

Course Code	**DCEA- 402**
Course Title	**Building Planning and Drawing Lab**
Number of Credits	**1 (L:0; T:0; P:2)**

List of Practicals

1. Draw various types of lines, graphical symbols for materials, doors and windows, symbols for sanitary, water supply and electrical installations and write abbreviations as per IS 962.
2. Write summary of observations of all technical details from the given drawing (One/Two BHK) obtained from the professional architect or civil engineer (Group activity in four students)
3. a) Measure the units of existing building (Load Bearing / Frame structure).
b) Draw line plan of measured existing building at **serial no 3a** to the suitable scale.
4. Draw line plan to suitable scale (Minimum 1BHK, staircase, WC and Bathroom)
a) Residential Bunglows (Minimum three plans)
b) Apartment (Minimum two plans)
5. Draw line plans to suitable scale for any **Five** Public Buildings from the following (School Building, Primary Health Centre, Bank, Post Office, Hostel, Restaurant, Community Hall and Library).
6. Draw the following plans for a Framed Structure (One/Two BHK) from given line plan.
a. Developed plan, Elevation
b. Section for above developed plan.
c. Site plan for above drawings including area statement, schedule of opening and construction notes.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	**DCEA- 403**
Course Title	**Water Resource Engineering**
Number of Credits	**3 (L:3; T:0; P:0)**

Course Objectives:

Following are the objectives of this course:
- To learn estimation of hydrological parameters.
- To understand water demand of crops and provisions to meet the same.
- To know planning of reservoirs and dams.
- To design irrigation projects, canals and other diversion works.

Course outcomes:

After competing this course, student will be able to:
- Estimate hydrological parameters.
- Estimate crop water requirements of a command area and capacity of canals.
- Execute Minor and Micro Irrigation Schemes.
- Select the relevant Cross Drainage works for the specific site conditions.
- Design, construct and maintain simple irrigation regulatory structures.

UNIT – I Introduction to Hydrology

Hydrology: Definition and Hydrological cycle. Rain Gauge: Symons rain gauge, automatic rain gauge, Methods of calculating average rainfall: Arithmetic mean, Isohyetal, and Theissen polygon
method. Runoff, Factors affecting Run off, Computation of run–off. Maximum Flood Discharge measurement: Rational and empirical methods, Simple numerical problems.

UNIT – II Crop water requirement and Reservoir Planning

Irrigation and its classification. Crop Water requirement: Cropping seasons, Crop period, base period, Duty, Delta, CCA, GCA, intensity of irrigation, factors affecting duty, Problems on water requirement and capacity of canal. Methods of application of irrigation water and its assessment. Surveys for irrigation project, data collection for irrigation project. Area capacity curve. Silting of reservoir, Rate of silting, factors affecting silting and control measures. Control levels in reservoir, Simple numerical problems on Fixing Control levels.

UNIT – III Dams and Spillways

Dams and its classification: Earthen dams and Gravity dams (masonry and concrete). Earthen Dams -Components with function, typical cross section, seepage through embankment and foundation and its control. Methods of construction of earthen dam, types of failure of earthen dam and preventive measures.
Gravity Dams – Forces acting on dam, Theoretical and practical profile, typical cross section,
drainage gallery, joints in gravity dam, concept of high dam and low dam.
Spillways-Definition, function, location, types and components, Energy dissipaters.

UNIT – IV Minor and Micro Irrigation

Bandhara irrigation: Layout, components, construction and working, solid and open bandhara. Percolation Tanks – Need, selection of site. Lift irrigation Scheme-Components and their functions, Lay out. Drip and Sprinkler Irrigation- Need, components and Layout. Well irrigation: types and yield of wells, advantages and disadvantages of well irrigation.

UNIT – V Diversion Head Works & Canals

Weirs – components, parts, types, K.T. weir – components and construction • Diversion head works – Layout, components and their function. Barrages – components and their functions. Difference between weir and Barrage. Canals – Classification according to alignment and position in the canal network, Cross section of canal in embankment and cutting, partial embankment and cutting, balancing depth, Design of most economical canal section. Canal lining - Purpose, material used and its properties, advantages. Cross Drainage works- Aqueduct, siphon aqueduct, super passage, level crossing. Canal regulators- Head regulator, Cross regulator, Escape, Falls and Outlets

Suggested learning resources:

1. Punmia, B.C., Pande, B, Lal, Irrigation and Water Power Engineering, Laxmi Publications
2. Subramanayan, Engineering Hydrology, McGraw Hill.
3. Mutreja K N, Applied Hydrology, McGraw Hill
4. Sharma, R.K. and Sharma, T.K., Irrigation Engineering, S.Chand

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content **SEMESTER- IV**

Course Code	**DCEA- 403**
Course Title	**Water Resource Engineering Lab**
Number of Credits	**1 (L:0; T:0; P:2)**

List of Practicals

- Calculate average rainfall for the given area using arithmetic mean method.
- Calculate average rainfall for the given area using isohyetal, Theissen polygon method .
- Compute the yield of the Catchment area demarcated in **Sr.No.2**.
- Delineation of contributory area for the given outlet from the given topo-sheet.
- Estimate crop water requirement for the given data.
- Estimate capacity of the canal for the given data.
- Calculate reservoir capacity from the given data.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	**DCEA- 404**
Course Title	**Theory of Structure**
Number of Credits	**4 (L:3; T:1; P:0)**

Course Objectives:

Following are the objectives of this course:
- To learn concept of eccentric loading and stresses in vertical members like column, chimneys, dam.
- To analyze beams using various methods like slope deflection, three moment, and moment distribution.
- To understand different methods of finding axial forces in trusses.

Course outcomes:

After competing this course, student will be able to:
- Analyze stresses induced in vertical member subjected to direct and bending loads.
- Analyze slope and Deflection in fixed and continuous beams.
- Analyze continuous beam under different loading conditions using the principles of Three Moments.
- Analyze continuous beam using Moment Distribution Method under different loading conditions.
- Evaluate axial forces in the members of simple truss.

UNIT – I Direct and Bending Stresses in vertical members

Introduction to axial and eccentric loads, eccentricity about one principal axis only, nature of stresses, Maximum and minimum stresses, resultant stresses and distribution diagram. Condition for no tension or zero stress at extreme fiber, Limit of eccentricity, core of section for rectangular and circular cross sections, Middle third rule. Chimneys of circular cross section subjected to wind pressure, Maximum and minimum stresses, resultant stresses and distribution diagram at base.

UNIT – II Slope and Deflection

Concept of slope and deflection, stiffness of beams, Relation among bending moment, slope, deflection and radius of curvature, (no derivation). Double integration method to find slope and deflection of cantilever and simply supported beams subjected to concentrated load and uniformly distributed load on entire span. Macaulay's method for slope and deflection, application to cantilever and simply supported beam subjected to concentrated and uniformly distributed load on entire span.

UNIT – III and Continuous Beam

Concept of fixity, effect of fixity, advantages and disadvantages of fixed beam over simply supported beam. Principle of superposition, Fixed end moments from first principle for beam subjected to point load, UDL over entire span. Application of standard formulae in finding end moments, end reactions and drawing S.F. and B.M. diagrams for a fixed beam. Drawing SF diagrams showing point of contraflexure, shear and BM diagrams showing net, BM and point of contraflexure for continuous beams.

UNIT – IV Moment distribution method

Introduction to moment distribution method, sign convention, Carry over factor, stiffness factor, distribution factor. Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.

Introduction to portal frames – Symmetrical and unsymmetrical portal frames with the concept of Bays and stories.

UNIT – V Simple trusses

Types of trusses (Simple, Fink, compound fink, French truss, pratt truss, Howe truss, North light truss, King post and Queen post truss). Calculate support reactions for trusses subjected to point loads at joints. Calculate forces in members of truss using Method of joints and Method of sections.

Suggested learning resources:

1. Ramamrutham.S, Theory of structures, Dhanpatrai & Sons.
2. Khurmi, R. S. , Theory of Structures S. Chand and Co., New Delhi.
3. Bhavikatti, S S , Structural Analysis Vol-1, ,Vikas Publishing House Pvt Ltd.New Delhi.
4. Junnarkar, S. B. , Mechanics of structures, Volume-I and II Charotar Publishing House, Anand.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	**DCEA- 405**
Course Title	**Programme Elective-1 (A) Transportation Engineering**
Number of Credits	**4 (L:3; T:1; P:0)**

Course Objectives:

Following are the objectives of this course:
- To identify the types of roads as per IRC recommendations.
- To understand the geometrical design features of different highways.
- To perform different tests on road materials.
- To identify the components of railway tracks.

Course outcomes:

After competing this course, student will be able to:
- Identify the types of roads as per IRC recommendations.
- Implement the geometrical design features of different highways.
- Perform different tests on road materials.
- Identify the components of railway tracks.
- Identify the defects in railway tracks.

UNIT – I Overview of Highway Engineering

Role of transportation in the development of nation, Scope and Importance of roads in India and its' Characteristics. Different modes of transportation – land way, waterway, airway. Merits and demerits of roadway and railway; General classification of roads. Selection and factors affecting road alignment.

UNIT – II Geometric Design of Highway

Camber: Definition, purpose, types as per IRC – recommendations. Kerbs: Road margin, road formation, right of way. Design speed and various factors affecting design speed as per IRC – recommendations. Gradient: Definition, types as per IRC – Recommendations. Sight distance (SSD): Definition, types IRC – recommendations, simple numerical. Curves: Necessity, types: Horizontal, vertical curves. Extra widening of roads: numerical examples. Super elevation: Definition, formula for calculating minimum and maximum Super elevation and method of providing super-elevation.

UNIT – III Construction of Road Pavements

Types of road materials and their Tests – Test on aggregates-Flakiness and Elongation Index tests, Angularity Number test, test on Bitumen- penetration, Ductility, Flash and Fire point test and Softening point test. Pavement – Definition, Types, Structural Components of pavement and their functions Construction of WBM road. Merits and demerits of WBM & WMM road. Construction of Flexible pavement / Bituminous Road, Types of Bitumen and its properties, Emulsion, Cutback, Tar, Terms used in BR-prime coat, tack coat, seal coat, Merits and Demerits of BR. Cement concrete road -methods of construction, Alternate and Continuous Bay Method, Construction joints, filler and sealers, merits and demerits of concrete roads. Types of joints.

UNIT – IV Basics of Railway Engineering

Classification of Indian Railways, zones of Indian Railways. Permanent way: Ideal requirement, Components; Rail Gauge, types, factors affecting selection of a gauge. Rail, Rail Joints - requirements, types. Creep of rail: causes and prevention. Sleepers - functions and Requirement, types - concrete sleepers and their density Ballast - function and types, suitability. Rail fixtures and fastenings – fish plate, spikes, bolts, keys, bearing plates, chairs-types of anchors and anti-creepers.

UNIT – V Track geometrics, Construction and Maintenance

Alignment- Factors governing rail alignment. Track Cross sections – standard cross section of single and double line in cutting and embankment. Important terms-permanent land, formation width, side drains, Railway Track Geometrics: Gradient, curves- types and factors affecting, grade compensation, super elevation, limits of Super elevation on curves, cant deficiency, negative cant, coning of wheel, tilting of rail. Branching of Tracks, Points and crossings, Turn out- types, components, functions and inspection.

Station -Purpose, requirement of railway station, important technical terms, types of railway station, factors affecting site selection for railway station. Station yard: Classification- Passenger, goods, locomotive and marshalling yards. Function & drawbacks of marshalling yards. Track Maintenance- Necessity, Classification, Tools required for track maintenance.

Suggested learning resources:

1. L.R. Kadiyali, Transportation Engineering, Khanna Book Publishing Co., Delhi (ISBN: 978-93- 82609-858) Edition 2018
2. Khanna S.K., Justo, C E G and Veeraragavan, A., Highway Engineering, Nem Chand and Brothers, Roorkee.
3. Arora, N. L., Transportation Engineering, Khanna Publishers, Delhi.
4. Saxena S C and Arora S P, A Textbook of Railway Engineering, Dhanpat Rai Publication.
5. Sharma, S.K., Principles, Practice and Design of Highway Engineering,, S. Chand Publication, New Delhi.
6. Duggal, Ajay K. and Puri, V. P., Laboratory Manual in Highway Engineering, New Age International (P) Limited, Publishers, New Delhi.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	**DCEA- 405**
Course Title	**Programme Elective-1 (B) Hydraulics**
Number of Credits	**4 (L:3; T:1; P:0)**

Course Objectives:

Following are the objectives of this course:
- To understand parameters associated with fluid flow and hydrostatic pressure.
- To know head loss and water hammer in fluid flowing through pipes.
- To learn different types of pumps and their uses.

Course outcomes:

After competing this course, student will be able to:
- Measure pressure and determine total hydrostatic pressure for different conditions.
- Understand various parameters associated with fluid flow
- Determine head loss of fluid flow through pipes.
- Find the fluid flow parameters in open channels.
- Select relevant hydraulic pumps for different applications.

UNIT – I Pressure measurement and Hydrostatic pressure

Technical terms used in Hydraulics –fluid, fluid mechanics, hydraulics, hydrostatics and hydrodynamics - ideal and real fluid, application of hydraulics. Physical properties of fluid – density-specific volume, specific gravity, surface tension, capillarity, viscosity-Newton's law of viscosity. Various types of pressure – Atmospheric Pressure, Gauge Pressure, Absolute Pressure, Vacuum Pressure. Concept of Pressure head and its unit, Pascal's law of fluid pressure and its uses. Measurement of differential Pressure by different methods. Variation of pressure with depth, Pressure diagram, hydrostatic pressure and center of pressure on immersed surfaces and on tank walls.

UNIT – II Fluid Flow Parameters

Types of flow – Gravity and pressure flow, Laminar, Turbulent, Uniform, Non-uniform, Steady, Unsteady flow. Reynolds number. Discharge and its unit, continuity equation of flow. Energy of flowing liquid: potential, kinetic and pressure energy. Bernoulli's theorem : statement, assumptions, equation.

UNIT – III Flow through pipes

Major head loss in pipe: Frictional loss and its computation by Darcy's Weisbach equation, Use of Moody's Diagram and Nomograms. Minor losses in pipe: loss at entrance, exit, sudden contraction, sudden enlargement and fittings. Flow through pipes in series, pipes in parallel and Dupuit's equation for equivalent pipe. Hydraulic gradient line and total energy line. Venturi meter - construction and working. Discharge measurement using Orifice, Hydraulic Coefficients of Orifice.

UNIT – IV Flow through Open Channel

Geometrical properties of channel section: Wetted area, wetted perimeter, hydraulic radius for rectangular and trapezoidal channel section. Determination of discharge by Chezy's equation and Manning's equation. Conditions for most economical rectangular and trapezoidal channel section. Discharge measuring devices: Triangular and rectangular Notches. Velocity measurement devices: current meter, floats and Pitot's tube. Specific energy diagram, Froudes' Number

UNIT – V Hydraulic Pumps

Concept of pump, Types of pump - centrifugal, reciprocating, submersible. Centrifugal pump: components and working. Reciprocating pump: single acting and double acting, components and working. Suction head, delivery head, static head, Manometric head. Power of centrifugal pump. Selection and choice of pump.

Suggested learning resources:

1. Modi, P. N.and Seth, S.M., Hydraulics and Fluid Mechanics, Standard book house, Delhi.
2. S.S. Rattan, Fluid Mechanics & Hydraulic Machines, Khanna Book Publishing Co., New Delhi
3. Ramamrutham, and Narayan, R., Hydraulics, Fluid Mechanics and Fluid Machines, Dhanpat Rai Publishing Company, New Delhi.
4. Khurmi R S, Hydraulics, Fluid Mechanics, Hydraulic machines, S. Chand Publishers
5. Rajput, R K, Fluid Mechanics, S Chand, New Delhi.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	**DCEA- 406**
Course Title	**Minor Project**
Number of Credits	**2 (L:0; T:0; P:4)**

Course Outcomes:

Build projects as per industry and society demands.

Guidelines:

Minor Project should cater to a small system required in laboratory or real life.
1.After interactions with course coordinator and based on comprehensive literature survey/need analysis, the student shall
identify the title and define the aim and Preambles of Minor project.
2. Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and
implementation and submit the proposal within first week of the semester.
3.The student is expected to exert on design, development and testing of the proposed work as per the schedule.

****

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Diploma Civil Engineering

Course Content

SEMESTER- IV

Course Code	DCEA- 407
Course Title	Mandatory Course (Essence of Indian Knowledge and Tradition)
Number of Credits	0 (L:2; T:0; P:0)

Course Objectives:

1 To explore the intersections between modern scientific principles and traditional Indian knowledge systems, highlighting
their complementarities and unique contributions.
2. To provide students with a comprehensive understanding of holistic health care practices, including Yoga and Ayurveda,
and their applications in promoting well-being.
3To impart knowledge about the historical and cultural significance of the Vedas and other ancient Indian texts, fostering
an appreciation for their enduring relevance in contemporary society.

Course outcomes:

1. Students will be able to critically analyze and apply concepts from both modern science and Indian knowledge systems to contemporary health and wellness challenges.
2. Students will gain practical knowledge and skills in Yoga and other holistic health practices, enabling them to incorporate these methods into their personal and professional lives for enhanced well-being.
3. Students will demonstrate an understanding of the historical and philosophical underpinnings of the Vedas and other Indian scriptures, appreciating their influence on modern thought and practices in holistic health care.

Course Content

1.Modern Science
2 .Indian Knowledge System

3. Yoga
4 Holistic Health care
5. वेद,

Reference Books:

1. Cultural Heritage of India-Course Material by V. Sivaramakrishna-Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Modern Physics and Vedant by Swami Jitatmanand - Bharatiya Vidya Bhavan
3. The wave of Life by Fritzof Capra
4. Tarkasangraha of Annam Bhatta, Inernational by V N Jha- Chinmay Foundation, Velliarnad,Amaku,
5. Science of Consciousness Psychotherapy and Yoga Practices by RN Jha - Vidyanidhi Prakasham, Delhi, 2016