Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE 601	DCS	WATER RESOURCE ENGINEERING	60	20	20	0	0	3	1	0	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective

The students (A) will be able to identify the different sources of water and apply the best techniques of allocation (B) according to condition and nature of work (C) efficiently & economically (D)

Course Outcomes:

1. Explain the different sources of water and its utilization according to the work
2. Analyze hydrographs, conversion of hydrographs from one form to another
3. Identify the different floods, frequency of floods, flood routings
4. Identify the Irrigation Water Requirements and methods of Irrigation
5. Differentiate the Canal Irrigation with Well Irrigation

Syllabus:

Unit - I

Hydrology : Hydrological cycle, precipitation and its measurement, recording and non recording rain gauges, estimating missing rainfall data, rain gauge net works, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves, Infiltration and infiltration indices, evaporation stream gauging, run off and its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complex storms, S-curve hydrograph, synthetic unit hydrograph.

Unit - II

Floods: Types of floods and their estimation by different methods, probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control

Unit-III

Ground Water and Well irrigation: Confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water recharge-necessity and methods of improving ground water storage. Water logging-causes, effects and its

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

prevention. Salt efflorescence causes and effects. Reclamation of water logged and salt affected lands. Types of wells, well construction, yield tests, specific capacity and specific yield, advantages and disadvantages of well irrigation.

Unit – IV

Irrigation water requirement and Soil-Water-Crop relationship: Irrigation, definition, necessity, advantages and disadvantages, types and methods. Irrigation developments, Soils - types and their occurrence, suitability for irrigation purposes, wilting coefficient and field capacity, optimum water supply, consumptive use and its determination. Irrigation methods surface and subsurface, sprinkler and drip irrigation. Duty of water, factors affecting duty and methods to improve duty, suitability of water for irrigation, crops and crop seasons, principal crops and their water requirement, crop ratio and crop rotation, intensity of irrigation.

Unit-V

Canals and Structures: Types of canals, alignment, design of unlined and lined canals, Kennedy's and Lacey's silt theories, typical canal sections, canal losses, lining-objectives, materials used, economics. Introductions to Hydraulic Structures viz. Dams, Spillways, Weirs, Barrages, Canal Regulation Structures.

Text Books:

1. Irrigation & Water Power Engg. by B.C. Punmia & Pandey B.B.Lal
2. Irrigation Engg. by S.K.Garg
3. Engg. Hydrology by K. Subhramanya - Tata Mc Graw Hills Publ. Co.
4. Engg. Hydrology - J.NEMEC - Prentice Hall

Reference Books:

1. Hydrology for Engineers Linsley, Kohler, Paulnus - Tata Mc.Graw Hill.
2. Hydrology & Flood Control by Santosh Kumar - Khanna Publishers

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE 602	DCS	STRUCTURAL ANALYSIS -II	60	20	20	0	0	3	1	0	4

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

1. To enable the student to have a good grasp of all the fundamental issues in these advanced topics in structural analysis,
2. To introduce the students to concept of structural stability and advanced methods in structural analysis.

Course Outcomes:

1. Analyze determinate and indeterminate structure with side sway
2. Apply flexibility matrix to analyze any structures related to civil engineering works
3. Apply stiffness matrix to analyze any structures related to civil engineering works
4. Fundamentals of plastic analysis and use the same in practical applications.

Syllabus:

UNIT I

Sway Analysis - Moment Distribution Method In Analysis Of Frames With Sway, Analysis Of Box Frames, Analysis Of Portals With Inclined Members. Analysis of Beams and Frames by Kani's Method

UNIT II

Approximate Method: Analysis of Tall Frames, Wind And Earthquake Loads, Codal Provisions For Lateral Loads Approximate Analysis of Multistory Frames For Vertical And Lateral Loads

UNIT III

Matrix Analysis (Flexibility Matrix)- Introduction Basic Concepts (Axis And Coordinates) Evaluation Of Flexibility Matrix. Analysis of Continuous Beams Using System Approach

UNIT IV

Matrix Analysis (Stiffness Method) Introduction Basic Concept,(Axis And Coordinates) Evaluation Of Stiffness Matrix Analysis of Continuous Beams Using System Approach.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

UNIT V

Plastic Analysis: Introduction, Shape Factor, Load Factor, Plastic Hinge, Plastic Analysis of Beams and Frame

Text Books:

1. Punmai, B.C., Ashok Kumar Jain, "Theory of Structure", Lakshmi Publication.
2. Ramamrutham, "Theory of Structure",
3. Bhavikatti,S.S, Structural Analysis, - Vol 1 and Vol 2,Vikas Publication.
4. Vaidhyanadan, R and Perumal , P, "Comprehensive Structural Analysis-Vol 1 & 2, Lakshmi Publication

Reference Books:

1. Ghali A & Neville M., Structural Analysis - A Unified classical and matrix Approach, Chapman and Hall, New York.
2. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
3. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
4. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
5. Norris C.H., Wilbur J.B. and Utkys. Elementry Structural Analysis, McGraw Hill International.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
BTCE 603	DCS	GEOTECHNICAL ENGINEERING-II	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective

1. To gain experience regarding the analysis and design of different foundations.
2. To provide an opportunity to learn how to identify ground condition.
3. To impart knowledge about the soil improvement techniques.

Course Outcomes:

1. To undertake design and analysis problem related to shallow foundation.
2. To undertake design and analysis problem related to deep foundation.
3. Identify ground conditions and suggest method of improvement
4. Design and assess the degree of improvement

Syllabus:

UNIT I

Shallow Foundations: Type of foundations shallow and deep. Bearing capacity of foundation on cohesion less and cohesive soils. General and local shear failures. Factors effecting B.C. Theories of bearing capacity - Prandle, Terzaghi, Balla, Skempton, Meyerh of and Hansan. I.S. code on B.c. Determination of bearing capacity. Limits of total and differential settlements. Plate load test

UNIT II

Deep Foundation: Pile foundation, Types of piles, estimation of individual and group capacity of piles in cohesion less and cohesive soils. Static and dynamic formulae, Pile load test, Settlement of pile group, Negative skin friction, under- reamed piles and their design. Piles under tension, inclined and lateral load Caissons. Well foundation. Equilibrium of wells, Analysis for stability tilts and shifts, remedial measures.

UNIT III

Soil Improvement Techniques: Compaction. Field and laboratory methods, Proctor compaction tests, Factors affecting compaction, Properties of soil affected by compaction, various equipment for field compaction and their suitability, Field compaction control, Lift

Chairperson
Board of Studies

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

thickness. Soil stabilisation: Mechanical, Lime, Cement, Bitumen, Chemical, Thermal, Electrical stabilisation and stabilisation by grouting. Geo-synthetics, type Functions, materials and uses.

UNIT IV

Soil Exploration and Foundations on Expansive and Collapsible soils: Methods of soil exploration. Planning of exploration programme for buildings, highways and earth dams, Disturbed and undisturbed samples and samplers for collecting them. Characteristics of expansive and collapsible soils, their treatment, Construction techniques on expansive and collapsible soils, CNS layer.

UNIT V

Sheet piles/Bulkheads and Machine foundation: Classification of sheet piles/bulkheads, Cantilever and anchored sheet piles, Cofferdams, materials, types and applications. Modes of vibration. Mass-spring analogy, Natural frequency. Effect of vibration on soils. Vibration isolation. Criteria for design. Design of block foundation for impact type of machine.

Text Books:

1. Soil Mech. & Found. Engg. by Dr. K.R. Arora - Std. Publishers Delhi.
2. Soil Mech. & Found. by Dr. B.C.Punmia- Laxmi Publications, Delhi.
3. Geotech Engg. by C. Venkatramaiah - New Age International Publishers, Delhi

Reference Books:

1. Soil Mech. & Found. Engg. by S.K. Garg- Khanna Publishers, Delhi.
2. Geo technical Lab Manual.
3. Relevant I.S. Codes.

List of Practical's:

1. Determination of the natural content of the given soil sample.
2. Indian Standard Light Compaction Test/Std. Proctor Test
3. Indian Standard Heavy Compaction Test/Modified Proctor Test
4. Determination of field density by Core Cutter Method
5. Determination of field density by Sand Replacement Method
6. Determination of field density by Water Displacement Method
7. Unconfined Compression Test
8. Triaxial compression test
9. Lab. Vane Shear test
10. CBR Test
11. Demonstration of Plate Load Test SPT & DCPT

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE 604	DCS	ENVIRONMENTAL ENGINEERING-I	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective

The course objective is to identify the sources and quantity of surface and ground water bodies and their demand for the public and also to study the quality of water and their treatment techniques.

Course Outcomes:

1. An insight into the structure of drinking water supply systems, including water transport, treatment and distribution.
2. An understanding of water quality criteria and standards, and their relation to public health,
3. The ability to design and evaluate water supply project alternatives on the basis of selection criteria

Syllabus:

UNIT I

Introduction: Introduction to environment and its component. Importance of water, sources of water-surface and ground water sources. Water (prevention and control of pollution) Act – 1974.
Water Demand: Types of water demand, Domestic demand, Industrial demand, Fire Demand etc. Per capita demand, variations in demand, Design period. Factors affecting water consumption. Population forecasting.

UNIT II

Quality of Water: Characteristics of water, physical, chemical and biological characteristics. Types of microbes, Water borne diseases and their control. Indian standard for drinking water.
Transmission of Water: Intake structure, types and working, pipe materials (merits & demerits)-cast iron, vertically cast and spun pipes, mild steel pipes, asbestos cement, R.C.C and prestressed pipes, pipe joints- bell and spigot joint, double flanged joints, special joints, rubber gaskets and roll on joints, valves, Corrosion in pipes - Galvanic, Biological, Stress Corrosion, pumps and pumping station.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

UNIT III

Treatment of Water: Various types of water treatment (Theory and Applications): Preliminary, secondary and tertiary. Screening: Course and Fine Screen, Design Criteria.
Sedimentation : Sedimentation tank, types- rectangular and circular settling basins, upward and horizontal flows, detention period, over flow rate, inlet and outlet devices, baffles, Design criteria for sedimentation tank. Coagulation: Theory of coagulation, common coagulants, feeding devices, mixing device, flocculation tank, Dewatering and disposal of sludge.

UNIT IV

Filtration: Theory of filtration, description of slow sand and rapid sand gravity filters, their comparison and merits, media characteristics for filters, size and depth, filter gravel and under drains, negative head and other problems in filtration, back washing of filters.
Disinfection: Mechanisms of disinfection, factors affecting efficiency of disinfection, criteria for a good disinfectant. Chlorination, types of chlorination-plain chlorination, pre chlorination, post Chlorination, double chlorination, super chlorination, dechlorination, Break Point Chlorination, chlorine demand, Doses of chlorine, Determination of Residual Chlorine-O.T. & O.T.A. test, other methods of disinfection in brief ozone, U.V. rays, Iodine, Bromine, Chlorine dioxide. Aeration & Water Softening: Types of hardness, methods of removal

UNIT V

Distribution of Water: Introduction, Requirements of a good distribution system, Layouts of distribution networks, Components of distribution system, method of distribution, system of supply, Hardy cross methods for network analysis. Function and types of distribution reservoirs, stand Pipe, Storage capacity of service reservoir. Leak detection, its importance, methods of leak detection.

Text Books:

1. Water Supply Engineering by S.K. Garg, Khanna Publishing Co

Reference Books:

1. Water Supply Engineering by B.C. Punmia - Laxmi Publications (P) Ltd. New Delhi
2. Water Supply & Sanitary Engg. by G.S. Birdi - Laxmi Publications (P) Ltd. New Delhi
3. Environmental Engineering by Peavy, H.S., Rowe D.R. and Techobanoglous, Mc Graw Hill, Book Company.
4. Manual of Water Supply and Water Treatment, Ministry of Urban Development, Govt.of India

List of Practical's:

1. To Study of sampling techniques for water.
2. To determine the pH value of given sample of water.
3. To determine the acidity of given sample of water.
4. To determine the alkalinity of given sample of water.
5. To determine turbidity in a given sample of water with the help of turbidity meter.
6. To determine the total hardness and calcium hardness in the given sample of water.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

7. To determine the amount of chlorides in the given sample of water.
8. To determine the dissolved oxygen in the given sample of water.
9. To determine the total, dissolved, and suspended solids in the given sample of water.
10. To determine optimum dose of coagulant with the help of jar test apparatus.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE 605(1)	DCS	TRAFFIC ENGINEERING	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

The aim of this course is to teach students about the traffic characteristic, traffic studies, intelligent transportation system and accidental studies in traffic engineering.

Course Outcomes:

1. Understand the traffic characteristic.
2. Perceive the knowledge about different studies involve in traffic.
3. Get knowledge about component intelligent transport system.
4. Get knowledge about accident studies and mass transportation.

Syllabus:

UNIT I

Traffic Characteristics: (i) Road user's characteristics - general human characteristics, physical, mental and emotional factors, factors affecting reaction time, PIEV theory. (ii) Vehicular characteristics: Characteristics affecting road design-width, height, length and other dimensions. weight, power, speed and braking capacity of a vehicle.

UNIT II

Traffic Studies: (i)Spot Speed Studies and Volume Studies.(ii) Speed and Delay Studies purpose, causes of delay, methods of conducting speed and delay studies. (iii) Origin and destination Studies (O & D) : Various methods, collection and interpretation of data, planning and sampling. (iv) Traffic Capacity Studies: Volume, density, basic practical and possible capacities, level of service. (v) Parking Studies: Methods of parking studies cordon counts, space inventories, parking practices.

UNIT III

Introduction to Intelligent Transportation Systems (ITS) – Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS - ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), video data collection

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

UNIT IV

Traffic Operations and Control: (i) Traffic regulations and various means of control.(ii) One way streets- advantages and limitations. (iii) Traffic signals- isolated signals, coordinated signals, simultaneous, alternate, flexible and progressive signal systems. Types of traffic signals, fixed time signals, traffic actuated signals, speed control signals, pedestrian signals, flashing signals, clearance interval and problems on single isolated traffic signal.

UNIT V

Accident Studies & Mass Transportation: (i) Accident Studies: Causes of accidents, accident studies and records, condition and collision diagram, preventive measures. (ii) Expressways and freeways, problems on mass transportation and remedial measures, brief study of mass transportation available in the country

Text Books:

1. Traffic Engineering and Transport Planning by L.R. Kadiyali, Khanna Publishers, Delhi
2. Traffic Engineering by Matson, W.S.Smith & F.W. Hurd
3. G.J. Pingnataro, Principles of Traffic Engineering

Reference Books:

1. D.R.Drew, Traffic Flaw Theory
2. W.R. Mchsne and R.P. Roess "Traffic Engg"
3. Wohl & Martin, Traffic System Analysis for Engineering & Planners

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE 605(2)	DCS	AIR QUALITY MONITORING & CONTROL	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective

This course provides a comprehensive overview of air and noise quality and the science and technology associated with the monitoring and control

Course Outcomes:

1. To acquire knowledge and understanding to evaluate air quality management and analyze the causes and effects of air pollution.
2. To identify the sources of air and noise pollution
3. To understand the concepts involved in control technologies

Syllabus:

Unit-I

Air pollution problem: Economics and social aspects, historical episodes of air pollution. Sources of Air pollution, effects of air pollution on health, animal, plants and materials

Unit-II

Role of meteorological condition, properties of typical air pollutants, air diffusion and Concentration pollutants. General diseases caused by air pollutants. Toxicity of various pollutants. Plums patterns and height of chimneys.

Unit-III

Atmospheric chemistry, formation of secondary pollutants – PNN, PBN, Photolytic cycles, general diseases and toxicity of pollutants

.

Unit-IV

Sampling and Analyzing of Air Pollutants: Instruments pollution survey, standards of air Pollution. Principle of air pollution control, site selection and zoning, various control methods, process and equipment changes, design and operation of various air pollution control equipments.

Unit-V

Air pollution control legislation, public education pollution standards, status of air pollution control in various countries. Industrial Hygiene: Concept and importance, factory Involved in environmental hazards, industrial ventilation occupational diseases, control methods.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER VI

Text Books:

1. Fundamentals of Air Pollutions - Raju BSN Oxford & IBH Publishing Co. Pvt. Ltd.
2. Air Pollution- Rao M.N. & Rao HVN - Tata Mc Graw Hill

Reference Books:

1. Air Pollution" - Faith W.L, John Wiley & Sons
2. "Air Pollution" - Mc Cabe L.C., Mc. Graw Hill, International
3. Air Pollution - Stern A.C., Academic Press N. York

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)