

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 1/4
Branch	CONSTRUCTION TECHNOLOGY & MANAGEMENT		Semester	6th	
Course Code	CO5	Course Name	WATER SUPPLY AND WASTE WATER ENGINEERING		
Course Outcome 1	Recognize the Water Sources , evaluate the quantity and analyze the characteristics of water.			Teach Hrs	Marks
Learning Outcome 1	Describe various sources of water and intake structure for given source of water.			8	10
Content	Necessity and brief description of PHE, Sources of water: surface and subsurface sources of water, well hydraulics, power, Intake Structures: definition and types, factors governing the location of an intake structure.				
Method of Assessment	Internal Theory Exam - Mid Semester I				
Learning outcome 2	Realize importance of population forecasting and estimate the quantity of water for design of effective water treatment plant.			6	7
Content	Flow diagram of water supply scheme, demands of water, variations of water demands, factors affecting rate of demand, design period, forecasting of population, methods of forecasting of population, (Simple problems on forecasting of population) , estimating of quantity of water supply required for city or town.				
Method of Assessment	External Theory Exam - Pen Paper Test				
Learning outcome 3	Explain physical, chemical and biological characteristics of water.			6	6
Content	Need for analysis of water, Characteristics of water- Physical, Chemical and Biological, testing of water for total solids, hardness, chlorides, dissolved Oxygen, pH, fluoride, nitrogen and its compounds, total count tests, E coli, B coli index, MPN, sampling of water, water quality standards as per IS 10500 , water borne disease.				
Method of Assessment	External Theory Exam - Pen Paper Test				
Learning outcome 4	Determine turbidity, pH value, TDS, DO of the given water sample.			10	
Content	<ol style="list-style-type: none"> 1. Determine the turbidity of the given sample of water. 2. Determine pH value of the given sample of water. 3. Determine suspended solid, dissolved solid and total solid of the given sample of water. 4. Determine the dissolved oxygen in the given sample of water. 				

Method of Assessment	Practical Exam - Both Internal and External		
Course outcome 2	Explain function of various stages of treatment of influent water.	Teach Hrs	Marks
Learning outcome 1	Describe the process of sedimentation with optimum dose of coagulant.	5	6
Content	Screening and types of screens, Aeration- objects and methods of aeration, plain sedimentation, sedimentation with coagulation, principles of coagulation, process of coagulation, types of coagulants, Jar Test, , types of sedimentation tanks, clariflocculator.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 2	Describe the process of filtration, disinfection and Miscellaneous water Treatments for water sample	12	13
Content	Filtration - mechanization of filtration, classification of filters: slow sand filter, rapid sand filter, pressure filter, construction and working of slow sand filter and rapid sand filter, operational problems in filtration, Disinfection: objects, methods of disinfection, chlorination, application of chlorine, forms of chlorination, types of chlorination, practices, residual chlorine and its importance, miscellaneous water treatments: water softening, defluoridation techniques. Advanced water Treatments :electrolysis. reverse osmosis, flow diagram of water treatment plants.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 3	Determine residual chlorine, Optimum Coagulant Content of the given water sample.	06	
Content	<ol style="list-style-type: none"> 1. Determine residual chlorine in the given sample of water. 2. Determine the optimum dose of coagulant in a given raw water sample by jar test. 		
Method of Assessment	Practical Exam - Both Internal and External		
Course outcome 3	Build Knowledge on conveyance and distribution of water.	Teach Hrs	Marks
Learning outcome 1	Describe different types of pipes and pipe fittings.	4	5
Content	Types of pipes used for conveyance of water, choice of pipe material, types of joints & types of valves-their use, location and function on a pipeline.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 2	Explain methods and layout of distribution of water.	10	10
Content	Methods of distribution of water- Gravity,pumping, and combined system Service reservoirs – functions and types , Layouts of distribution of water- Dead end system, grid iron system, circular system, radial system ; their		

	suitability, advantages and disadvantages		
Method of Assessment	Internal Theory Exam - Mid Semester I		
Course outcome 4	Explain sanitation, sewerage system and its various accessories.	Teach Hrs	Marks
Learning outcome 1	Describe various terms related to building sanitation and draw layout plan of drainage system for the given building.	10	10
Content	Importance and necessity of sanitation, necessity to treat domestic sewage, Recycling and Reuse of domestic waste, definitions of the terms related to building sanitation- water pipe, rain water pipe, soil pipe, sullage pipe, vent pipe, Building Sanitary fittings- water closet –Indian and European type, flushing cistern, wash basin, sinks, urinals, traps- types and qualities of good trap, principles of design of building drainage, systems of plumbing – one pipe, two pipe, single stack, layout plan for building sanitary fittings (drainage plan), inspection and junction chambers, their necessity, location.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 2	Describe design principles for a sewerage system.	5	5
Content	Definitions- sewage, sullage, types of sewage, types of sewers, systems of sewerage, principles of design of sewers, self-cleansing velocity and non-scouring velocity, laying, testing and maintenance of sewers.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 3	Explain accessories of sewerage system.	5	5
Content	Sewer appurtenances- manholes and drop manholes -component parts, location, spacing, sewer inlets, street inlets, maintenance and cleaning of manhole, flushing tanks – manual and automatic.		
Method of Assessment	Internal Theory Exam - Assignment/Quiz/Seminar/Presentation.		
Course outcome 5	Explicate characteristics and treatment of sewage, Solid Waste, Industrial Waste and Rural Sanitation	Teach Hrs	Marks
Learning Outcome 1	Describe characteristics for a given sewage sample and sewage treatment processes.	17	13
Content	Characteristics of sewage, B.O.D./ C.O.D. and significance, aerobic and anaerobic process, norms for the discharge of treated sewage, objects of sewage treatment, general layout and flow diagram, screening, grit removal, skimming, sedimentation of sewage, sludge digestion, trickling filters, activated sludge process, disposal of sewage, septic tank, oxidation pond, oxidation ditch, common complaints in the operation of septic tank and remedies.		

Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 2	Explain Management and Utilization of solid waste and types, characteristics and disposal of Industrial waste.	5	5
Content	Definitions: Refuse, Rubbish, Garbage, Ashes. Constituents of solid wastes. Methods of collection of solid wastes. Methods of treatment and disposal of solid waste. Types of industrial waste Hazardous and non-hazardous waste. Major characteristic of waste from the following industries: textile, sugar, leather, dairy paper and pulp and food. General idea regarding disposal of waste from above industries.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 3	Explain Rural Sanitation	5	5
Content	Rural sanitation, necessity and importance, types of privies – aqua privy and bore hole latrine, construction and working, method of disposal of domestic waste.		
Method of Assessment	Internal Theory Exam: Assignments/ Seminars/ Presentations		
Learning outcome 4	Determine D.O,B.O.D,C.O.D, of the given waste water sample and Design the Septic Tank.	06	
Content	1. Determine D.O., B.O.D., C.O.D. of the given waste water sample. 2. Design the Septic Tank for the public building such as hostel or hospital. Draw Plan and Section of the same along with the drainage arrangement in soak pit.		
Method of Assessment	Practical Exam - Both Internal and External		

Note: 1. Internal marks of practical exam is mentioned in Format 4.

2. External practical exam will be of maximum 30 marks and any of the practical mentioned in LO's can be assessed.

List of Suggested Books: -

S. No.	Authors	Title	Publisher
1.	Husain. S.K.	Text Book of Water supply and sanitary Engg.	Oxford and IBH publishing Co. New Delhi
2.	Birdie, G.S. and Bridie, J.S.	Water supply and Sanitary Engg.	Dhanpat Rai & Sons, Delhi
3.	Sunil and Rajjan	Jal ApurtiEvamSwachchhataEngg.	NavbhartPrakashan, Meerut

4.	Gurucharan Singh	Water Supply & Sanitary Engg.	Standard Publishers
5.	Saxena, A.K.,	LokSwasthyaYantriki	Deepak Prakashan Gwalior
6.	Santosh garg	Environmental Engg. (Volume I & II)	Khanna Publishers,
7.	S.C Rangwala	Water Supply & Sanitary Engg	Charottas Publishing House
8.	The committee on PHE Manual and code of practice, The Ministry of Health, Govt. of India, "PHE Manual and code of practice – Sections, I, II, III and IV.		
9.	I.S. : 1172, 1742, 2065, 2470 and 5329		

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			1	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Recognize the Water Sources , evaluate the quantity and analyze the characteristics of water..										
LO Description	Describe various sources of water and intake structure for given source of water.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Necessity and brief description of PHE, Sources of water: surface and subsurface sources of water,well hydraulics, power, Intake Structures: definition and types, factors governing the location of an intake structure.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	8	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Students will be asked to identify the role of PHE engineer, give sources of water, describe well hydraulics and intakes.	10	Test Paper + Rating scale		Handouts, chalk board, PPT, text book, charts, video film.		Internal			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of Internal Exam – Mid Semester Test-I											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			1	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Recognize the Water Sources , evaluate the quantity and analyze the characteristics of water.										
LO Description	Explain the methods of forecasting population for estimating quantity of water supply scheme.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Flow diagram of water supply scheme, demands of water, variations of water demands, factors affecting rate of demand, design period, forecasting of population, methods of forecasting of population, (Simple problems on forecasting of population) , estimating of quantity of water supply required for city or town.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	06	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Student will be asked to explain various demand of water, methods of forecasting population for estimating quantity of water.	07	Test Paper + Rating scale		Handouts, chalk board, PPT, text book, charts, video film.		External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			1	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Recognize the Water Sources , evaluate the quantity and analyze the characteristics of water.										
LO Description	Explain physical ,chemical and biological characteristics of water.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Need for analysis of water, Characteristics of water- Physical, Chemical and Biological, testing of water for total solids, hardness, chlorides, dissolved Oxygen, pH, fluoride, nitrogen and its compounds, total count tests, E coli, B coli index, MPN, sampling of water, water quality standards as per IS 10500 , water borne disease.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	06	00	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required	External / Internal				
1	Theory exam	Student will be asked to explain characteristics of water, Water quality standards as per IS 10500 and water borne diseases.	06	Test Paper + Rating scale		Handouts, chalk board, PPT, text book, charts, video film.	External				
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			1	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Recognize the Water Sources , evaluate the quantity and analyze the characteristics of water.										
LO Description	Determine turbidity, pH value, TDS, DO of the given water sample.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	1.Determine the turbidity of the given sample of water. 2.Determine pH value of the given sample of water. 3.Determine suspended solid, dissolved solid and total solid of the given sample of water. 4.Determine dissolved oxygen in the given sample of water.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	00	12	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Practical Exam	Students will be asked to perform any of the above test.		Rating scale/ Rubrics		Handouts, chalk board, PPT, text book, charts, video film.		Both			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of Practical Exam : Internal Marks for Practical : 10Marks											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	O	5				
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explain function of various stages of treatment of influent water										
LO Description	Describe the process of sedimentation with optimum dose of coagulant.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Screening and types of screens, Aeration- objects and methods of aeration, plain sedimentation, sedimentation with coagulation, principles of coagulation, process of coagulation, types of coagulants, Jar Test, , types of sedimentation tanks, clariflocculator.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	05	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria	Resources Required	External / Internal					
1	Theory exam	Students will be asked to describe any process of treatment of water.	06	Test Paper + Rating scale	Handouts, chalk board, PPT, text book, charts, video film.	External					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					C	0	5				2	2	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING												
CO Description	Explain function of various stages of treatment of influent water.												
LO Description	Describe the process of filtration, disinfection and miscellaneous water treatments for water sample.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Filtration - mechanization of filtration, classification of filters: slow sand filter, rapid sand filter, pressure filter, construction and working of slow sand filter and rapid sand filter, operational problems in filtration, Disinfection: objects, methods of disinfection, chlorination, application of chlorine, forms of chlorination, types of chlorination, practices, residual chlorine and its importance, miscellaneous water treatments: water softening, defluoridation techniques, Advanced Water Treatments: electrolysis. reverse osmosis, flow diagram of water treatment plants.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	12	0	Text book, video lectures, chalk board.	NIL						
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria	Resources Required	External / Internal							
1	Theory exam	Student will be asked to explain mechanism of filtration, construction of any filter.	13	Test Paper + Rating scale	Handouts, chalk board, PPT, text book, charts, video film.	External							
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of end semester theory exam													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			2	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explain function of various stages of treatment of influent water										
LO Description	Determine residual chlorine, optimum coagulant content of the given water sample.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	1. Determine residual chlorine in the given sample of water. 2. Determine the optimum dose of coagulant in a given raw water sample by jar test.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	00	06	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria	Resources Required	External / Internal					
1	Practical Exam	Students will be asked to perform any of the above test.		Rating scale/ Rubrics	Handouts, chalk board, PPT, text book, charts, video film.	Both					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of Practical Exam : Internal Marks for Practical :05Marks											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					<i>C</i>	<i>0</i>	<i>5</i>			3	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Build Knowledge on conveyance and distribution of water.										
LO Description	Describe different types of pipes and pipe fittings.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Types of pipes used for conveyance of water, choice of pipe material, types of joints & types of valves-their use, location and function on a pipeline.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	04	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Student will be asked to explain types of pipe material and joints.	05	Test Paper + rating scale		Handouts, chalk board, PPT, text book, charts, video film.		External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5				
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explain sanitation, sewerage system and its various accessories.										
LO Description	Describe various terms related to building sanitation and draw layout plan of drainage system for the given building.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Importance and necessity of sanitation, necessity to treat domestic sewage, Recycling and Reuse of domestic waste, definitions of the terms related to building sanitation- water pipe, rain water pipe, soil pipe, sullage pipe, vent pipe, Building Sanitary fittings- water closet – Indian and European type, flushing cistern, wash basin, sinks, urinals, traps- types and qualities of good trap, principles of design of building drainage, systems of plumbing – one pipe, two pipe, single stack, layout plan for building sanitary fittings (drainage plan), inspection and junction chambers, their necessity, location.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	10	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Student will be asked to describe sanitation, recycling of waste, various sanitary fittings.	10	Test Paper + rating scale		Handouts, chalk board, PPT, text book, charts, video film.		External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			4	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explain sanitation, sewerage system and its various accessories.										
LO Description	Describe design principles for a sewerage system.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Definitions- sewage, sullage, types of sewage, types of sewers, systems of sewerage, principles of design of sewers, self-cleansing velocity and non-scouring velocity, laying, testing and maintenance of sewers.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	05	00	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Students will be asked to define sewage, sullage and systems of sewerage.	05	Rating scale/ Rubrics		Handouts, chalk board, PPT, text book, charts, video film.		External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			4	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explain sanitation, sewerage system and its various accessories.										
LO Description	Explain accessories of sewerage system.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Sewer appurtenances- manholes and drop manholes -component parts, location, spacing, sewer inlets, street inlets, maintenance and cleaning of manhole, flushing tanks – manual and automatic.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	05	00	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Student will be asked to explain sewer appurtenances and necessity of manhole.	05	Rating scale/ Rubrics		Handouts, chalk board, PPT, text book, charts, video film.		Internal			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Internal Theory Exam - Assignment/Quiz/Seminar/Presentation.											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			5	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explicate characteristics and treatment of sewage, Solid Waste, Industrial Waste and Rural Sanitation										
LO Description	Describe characteristics for a given sewage sample and sewage treatment processes.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Characteristics of sewage, B.O.D./ C.O.D. and significance, aerobic and anaerobic process, norms for the discharge of treated sewage, objects of sewage treatment, general layout and flow diagram, screening, grit removal, skimming, sedimentation of sewage, sludge digestion, trickling filters, activated sludge process, disposal of sewage, septic tank, oxidation pond, oxidation ditch, common complaints in the operation of septic tank and remedies.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	17	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Student will be asked to describe characteristics and treatment of sewage .	13	Rating scale/ Rubrics		Handouts, chalk board, PPT, text book, charts, video film.		External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			5	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explicate characteristics and treatment of sewage, Solid Waste, Industrial Waste and Rural Sanitation										
LO Description	Explain Rural Sanitation.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Rural sanitation, necessity and importance, types of privies – aqua privy and bore hole latrine, construction and working, method of disposal of domestic waste.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	05	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Student will be asked to submit assignments giving details regarding solid waste management and industrial waste.	05	Rating scale/ Rubrics		Handouts, chalk board, PPT, text book, charts, video film.		External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of end semester theory exam											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	0	5			5	
COURSE NAME	WATER SUPPLY AND WASTE WATER ENGINEERING										
CO Description	Explicate characteristics and treatment of sewage, Solid Waste, Industrial Waste and Rural Sanitation										
LO Description	Explain Rural Sanitation.										
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	Rural sanitation, necessity and importance, types of privies – aqua privy and bore hole latrine, construction and working, method of disposal of domestic waste.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	05	0	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria		Resources Required		External / Internal			
1	Theory exam	Student will be asked to submit assignments giving details regarding rural sanitation.	05	Rating scale/ Rubrics		Handouts, chalk board, PPT, text book, charts, video film.		Internal			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of Internal Exam – Assignments/Seminars/Presentations											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					C	O	5				
COURSE NAME		WATER SUPPLY AND WASTE WATER ENGINEERING									
CO Description		Explicate characteristics and treatment of sewage, Solid Waste, Industrial Waste and Rural Sanitation									
LO Description		Determine D.O,B.O.D,C.O.D, of the given waste water sample and design the septic tank.									
SCHEME OF STUDY											
S. No.	Learning Content	Method of teaching	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	<p>1. Determine D.O., B.O.D., C.O.D.of waste water sample.</p> <p>2. Design the septic tank for the public building such as hostel or hospital and draw plan and section of the same along with the drainage arrangement in soak pit.</p>	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	00	06	Text book, video lectures, chalk board.	NIL				
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Passing Criteria	Resources Required	External / Internal					
1	Practical Exam	Students will be asked to perform any of the above test.		Rating scale/ Rubrics	Handouts, chalk board, PPT, text book, charts, video film.	Both					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Part of Practical Exam : Internal Marks for Practical : 05 Marks											

Note: 1. Internal practical marks of practical LOs are mentioned in additional instructions.

2. External practical exam will be of maximum 30 marks and any of the practical mentioned in LO's can be assessed.