



COURSE PLAN – PART I			
Name of the programme and specialization	M. Tech.		
Course Title	Transport of water and wastewater		
Course Code	CE 711	No. of Credits	3
Course Code of Pre-requisite subject(s)			
Session	January 2021	Section (if, applicable)	
Name of Faculty	G Swaminathan	Department	Civil Engineering
Official Email	gs@nitt.edu	Telephone No.	+914312503159
Name of Course Coordinator(s) (if, applicable)	Not applicable		
Official E-mail	-	Telephone No.	+914312503151
Course Type (please tick appropriately)	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
Fluid properties - fluid flow - continuity principle, energy principle and momentum principle - frictional head loss in free and pressure flow, minor heads losses, Carrying Capacity - Flow measurement - Estimation of storage capacity - impounding reservoirs - intakes - gravity and pressure conduits - hydraulics of fluid flow - pumps and accessories - capacity of pumps - selection of pumps - maintenance - economic design of pumps and pumping mains , Jointing, laying and maintenance, water hammer analysis - water distribution pipe networks Design, analysis and optimization – appurtenances - corrosion prevention - minimization of water losses - leak detection - storage reservoirs- Storm water Drainage - Necessity- combined and separate system - Estimation of storm water runoff - Formulation of rainfall intensity duration and frequency relationships - Rational methods - Planning factors - Design of sanitary sewer - partial flow in sewers, economics of sewer design - Wastewater pumps and pumping stations- sewer appurtenances - material, construction, inspection and maintenance of sewers - Design of sewer outfalls - mixing conditions; transition flow critical depth in sewers - draw down curves and hydraulic jump - Use of computer software in water transmission, water distribution, sewer and storm water design – EPANET 2.0, SEWER, BRANCH and Canal ++.			
COURSE OBJECTIVES			
1. To learn the water transmission under gravity as well as pressure flow 2. To Optimize the cost of pumping main for various flow constraints 3. To design water distribution networks . 4.To learn the system of collection of sewage and transport of sewage.			



5. Computer applications in the design of water distribution and sewer networks ⁵	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO)
1.To learn the water transmission under gravity as well as pressure flow	1,3,4,5,7,8,9,10&11.
2. To Optimize the cost of pumping main for various flow constraints	1,2,3,4, 5,7, 9,10&11
3.To design water distribution networks .	1,2, 4,5,6,7,8, 9,10&11
4.To learn the system of collection of sewage and transport of sewage.	1,2, 4,5,6,7,8, 9,10&11
5.Computer applications in the design of water distribution and sewer networks ⁵	1,2, 4,5,6,7,8, 9,10&11

COURSE PLAN – PART II			
COURSE OVERVIEW			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1	Introduction to fluid flow in conduits-Newtonian and non Newtonian fluids-Losses in fluid transport-Laminar and Turbulent flow losses	Lecture mode and Tutorials
2	Week 2	Hazen Poiseuille Equation-Manning's formula-Hazen Williams formula-Applicability of different formulae in fluid transmission-Limitations	Lecture mode and Tutorials
3	Week 3	Appurtenances in pipe transmission-Losses in system-Pumping and gravity system of transmission of water-Losses-Design of Pumping system	Lecture mode and Tutorials
4	Week 4	Pumping main – Selection of Pumping main based on economic analysis.	Lecture mode and Tutorials
5	Week 5	Pumping main with multiple withdrawal-Optimisation-Introduction to Grey Wolf optimization and conventional Lagrange's operation process- Cycle test-I	Lecture mode and Tutorials



6	Week 6	Cycle test corrected -paper distribution-Layouts of water distribution system	Lecture mode and Tutorials
7	Week 7	Water supply distribution-Hardy cross algorithm	Lecture mode and Tutorials
8	Week 8	Water supply distribution-Assuming head and correction to assumed head-Node point approach.	Lecture mode and Tutorials
9	Week 9	Newton Raphson Algorithm of solving water supply network Reservoir capacity	Lecture mode and Tutorials
10	Week 10	Combined and separate system of sewage. Design of sewer system	Lecture mode and Tutorials. PowerPoint presentation
11	Week 11	Combined sewer –assessment of flow Test II	Lecture mode and Tutorials. PowerPoint presentation
12	Week 12	Cycle test corrected –Partial flow Sewer accessories Sewage pumping	Lecture mode and Tutorials. PowerPoint presentation
13	Week 13	Applicaion of computing tools in water and wastewater transport	Power point presentation
14	Week 14	Mini project assessment. Final End semester Examination	Examination

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week	Duration	% Weightage
1	Cycle Test I	5/6	1h	25
2	Cycle test II	10/11	1 h	25
3	Assignments/Tutorials/Quiz/ Seminar	Then and there	-	20
CPA	Compensation Assessment*	13	1 h	25



4	Final Assessment *	14	3 h	30
Passing minimum: 40%				
COURSE EXIT SURVEY				
Online Feedback in Institute MIS. The students should fill in the required details honestly, so as to improve the teaching learning process				
COURSE POLICY (including compensation assessment to be specified)				
<ol style="list-style-type: none"> Attendance during the assessment days is compulsory. 75 % attendance is mandatory to attend End semester examination. It is the duty of the faculty to compensate the classes which are cancelled due to some reasons are what so ever On duty –Participation is limited to 10 % of total classes conducted-approving authority is the HoD/Civil Engineering. If the student for genuine reasons absent himself from writing the cycle test(s), retest will be conducted. The decision of conducting such retest(s) rest with the faculty member handling the course. The portion for retest will be subject taught from the beginning of the semester to the date on which retest is scheduled. The decision /discretion of faculty is binding and final. This rule is applicable to end semester examinations also. If for genuine reason(s), the student is absent for the end semester examination, the teacher is empowered to conduct a separate semester examination for such student(s) Appellate/Redressal Authority is HoD/Civil Engineering in case of dispute/grievance. The grading policy is same as the guidelines and given in B.Tech. regulations of NIT Tiruchirappalli. 				
<u>ATTENDANCE POLICY</u>				
<ol style="list-style-type: none"> At least 75% attendance in each course is mandatory. A maximum of 10% shall be allowed under On Duty (OD) category. Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade. 				
<u>ACADEMIC DISHONESTY & PLAGIARISM</u>				
<ol style="list-style-type: none"> Resorting to unethical means during the online examination is to be avoided. Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark. The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office. The above policy against academic dishonesty shall be applicable for all the programmes. 				
ADDITIONAL INFORMATION, IF ANY				



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Department of Civil Engineering

FOR APPROVAL		
Course Faculty G Swaminathan	CC- Chairperson Dr R MANJULA	HOD G Swaminathan