

M. Tech. Water Resource Engineering 1st Semester

S. No.	Course Code	Course Title	L	T	P	C
1	MA-501 A	Advanced Course in Mathematics	2	1	0	3
2	CE-541	Remote sensing and GIS Applications	3	0	0	3
3	CE-542	Free Surface Flow	3	0	0	3
4	CE-543	Advance Hydraulics and Computer Lab	0	0	3	2
5	-	Program Elective-I	3	0	0	3
6	-	Program Elective-II	3	0	0	3
7	-	Open Elective I	-	-	-	3
Total			X	X	X	20

L=Lecture hours/week P=Practical hours/week T=Tutorial hours/week

C=Credits

CE 541 Remote Sensing & GIS Applications Cr. 3: (3-0-0)

Remote Sensing: Basic concepts. Elements of visual Image interpretation, Multi-spectral Remote Sensing Systems, Introduction to Thermal Infrared Remote Sensing, Platforms & Sensors: LANDSAT-TM, IRS and SPOT. Geometric & Radiometric Corrections and Ground truth. Digital Image Processing, Geographical Information Systems and its applications. Digital Representation of Geographic data , Raster and Vector Based GIS data, Spatial analysis.

Reference Books:

1. Principles of Remote Sensing: Curran, P.J.
2. Remote Sensing & DIP: Lillesand & Keifer
3. Manual of Remote Sensing I & II

CE 542 Free Surface Flow Cr. 3: (3-0-0)

Energy and Momentum principles in open channel flow, Principles of varied flow. Non-uniform Flow: Direct integration method, step methods, computer methods. spatially varied flow. Channel controls: Sharp crested and broadcrested weirs, overflow spillway, free overfall and energy dissipaters. Channel transitions: expansions and contractions. Changes of directions, culverts, bridge piers, lateral inflow and outflow, transition design. Unsteady flow: Equation of motion. Shallow water equations and their solutions. Method of characteristics. Dam-break problems. Kinetic wave theory. Flood wave movement in long rivers. Waves: Standing waves. Waves in a moving stream. Finite amplitude wave theory. Models and Similitude: Basic principles. Incomplete & approximate similitude. Fixed-bed, Moving-bed river models and structural models.

Reference Books

1. Open Channel Hydraulics : V. T. Chow
2. Open Channel Hydraulics : K. G. Ranga Raju
3. Open Channel Hydraulics : K. Subramanya.

CE 543 Advance Hydraulics and Computer Lab

Cr. 2: (0-0-3)

Hydraulics: Hydraulic Jump with length of jump, Sand – Tank model, Wind Tunnel, GPS

Computers: Use of Microsoft Excel for engineering applications such as design of canals, CPM; Hydraulics & hydrology software, culvert design etc.

In this course the stress will be given on Computational Hydraulics and Advanced instrumentation for flow measurement.