INTRODUCTION TO FLUID MECHANICS (GR20A2012)

II- B.Tech – I Semester

(AY 2021-22)

S VENKAT CHARYULU
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Gokaraju Rangaraju Institute of Engineering and Technology
Bachupally, Kukatpally, Hyderabad – 500 090.

Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
Introduction to Fluid Mechanics
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GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
INTRODUCTION TO FLUID MECHANICS
Course Code: GR20A2012 L/T/P/C: 3/0/0/3

II Year I Semester

Pre Requisite: Mathematics

Course Objectives:

1. Introduce the concepts of fluid mechanics useful in Civil Engineering application
2. Measurement of pressure, computations of hydrostatic forces and the concepts of Buoyancy all final useful applications in many engineering problems.
3. Identifying the nature and behavior of fluid flows and distinguish fluid dynamics and kinematics
4. Describe the boundary layer flows and predict the drag and lift forces
5. Classify the head losses in pipe flows and skill seeing of measurement of flows.

Course Outcomes:

At the end of course, the student will be able to

1. Comprehend the various fluid properties and fluid statics.
2. Understand the broad principles of hydrostatic forces on submerged planes
3. Analyzing fluid dynamics and kinematics.
4. classify concept of boundary layer and predict the laminar and turbulent flows
5. Predict the losses in pipes flows and able to calculate discharge measurement.

Unit-I

Basic Concepts and Definitions Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility. Fluid Statics - Fluid Pressure: Pressure at a point, Pascal law, pressure variation with temperature, density and altitude. Piezometer, U- Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micro manometers. pressure gauges

Unit-II

Hydrostatic Law, Hydrostatic pressure and force: horizontal, vertical and inclined curved surfaces. Introduction explanatory to Buoyancy and meta centre

Unit-III

Fluid Kinematics- Classification of fluid flow: steady and unsteady flow; uniform and non- uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows ,Stream line, path line, streak line and stream tube; stream function, velocity potential function. One-, two- and three - dimensional continuity equations in 3D-Cartesiancoordinates

Fluid Dynamics- Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : venturimeter, Momentum principle; Forces exerted by fluid flow on pipe bend;

Unit-IV

Boundary Layer Analysis-Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and Turbulent boundary layers on a flat plate; Laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Controlof boundary layer. N-S equation explanatory.

Laminar Flow- Laminar flow through straight circular pipes.

Turbulent Flow- Reynolds experiment, Transition from laminar to turbulent flow. Definition of turbulence, Causes of turbulence, effect of turbulent flow in pipes. Characteristics of laminar and turbulent flows

Unit-V

Flow through Pipes: Loss of head through pipes, Darcy-Wiesbatch equation, minor losses (explanatory), total energy equation, hydraulic gradient line, Pipes in series, equivalent pipes, pipes in parallel.

Measurement of Discharge and Velocity : Flow over rectangular, triangular and trapezoidal and Stepped notches. Venture meter, orifice meter and pitot tube.

Text Books

1. Modi and Seth, Fluid Mechanics, Standard book house, 19th Edition, 2011.

2. S.K.Som & G.Biswas, Introduction to Fluid Machines, Tata Mc.Graw Hill publishers,Pvt. Ltd., 3rd Edition, 2012.

3. Edward J. Shaughnessy, M. Katz and James P. Schaffer, Introduction to Fluid Machines, Oxford University Press, New Delhi, 1st Edition, 2005

References Books

1. J.F.Douglas, J.M. Gaserek and J.A.Swaffirld, Fluid Mechanics, 5th longmanEdition, 2005.

2. Frank.M. White, Fluid Mechanics, Tata Mc. Graw Hill Pvt. Ltd, 4th Edition, 2013.

3. A.K. Mohanty, Fluid Mehanics, Prentice Hall ofIndia Pvt. Ltd., New Delhi, 2nd Edition, 1994.

4. Dr. R.K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi

5. Publications (P) ltd., New Delhi, 9th Edition, 2012.

Time Table

S Venkat charyulu

	1	2	3	4	5	6	7
Monday							
Tusday							IFM 1.20 to 2.15pm
Wednesday							
Thursday	IFM 9.00 -to 10.40 AM						
Friday							
Saturday				IFM 1.20 - 2.45pm			

Department of Civil Engineering

Department of Civil Engineering (GR20 Regulation)

Vision

To become a pioneering centre in Civil Engineering and technology with attitudes, skills and knowledge

Mission

M1: To produce well qualified and talented engineers by imparting quality education.
M2: To enhance the skills of entrepreneurship, innovativeness, management and lifelong learning in young engineers.

M3: To inculcate professional ethics and make socially responsible engineers

Program Educational Objectives (PEOs)

PEO1: Graduates of the program will be successful in technical and professional career of varied sectors of Civil Engineering.

PEO2: Graduates of the program will have proficiency to analyze and design real time Civil Engineering projects.

PEO3: Graduates of the program will exhibit management and leadership qualities with good communication skills facilitating to work in a multidisciplinary team.

PEO4: Graduates of the program will continue to engage in life-long learning with ethical and social responsibility.

Program Outcomes (PO's)

Graduates of the Civil Engineering program will be able to

PO1: Apply knowledge of mathematics, science and fundamentals of Civil Engineering.
PO2: Analyse problems and interpret the data.
PO3: Design a system component, or process to meet desired needs in Civil Engineering within realistic constraints
PO4: Identify, formulate, analyse and interpret data to solve Civil Engineering problems.
PO5: Use modern engineering tools such as CAD and GIS for the Civil Engineering practice.
PO6: Understand the impact of engineering solutions in a global, economic and societal context.
PO7: Understand the effect of Civil Engineering solutions on environment and to demonstrate the need for sustainable development.
PO8: Understand the professional and ethical responsibility.
PO9: Work effectively as an individual or in a team and function with multi-disciplinary context.
PO10: Communicate effectively with engineering community and society.
PO11: Demonstrate the management principles in Civil Engineering projects.
PO12: Recognize the need for and an ability to engage in life-long learning.

Program Specific Outcomes (PSO's)

PSO1: Recognize the need for a sustainable environment and design smart infrastructure considering the global challenges.
PSO2: Create and develop innovative designs with new era materials through research and development.

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Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

COURSE OBJECTIVES

Academic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech ……II…… Year: ……2021-22 Section: A

Course/Subject: …… INTRODUCTION To FLUID MECHANICS Course Code: …… GR1A2010

Name of the Faculty: …… S.VENKAT CHARYULU …… Dept. CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

On completion of this Subject/Course the student shall be able to:

S.No	Objectives
1	Elaborate the concepts of fluid mechanics useful in Civil Engineering application
2	Analyze the Measurement of pressure, computations of hydrostatic forces and the concepts of Buoyancy all final useful applications in many engineering problems
3	Recognize the nature and behavior of fluid flows and distinguish fluid dynamics and kinematics
4	Describe the boundary layer flows and predict the drag and lift forces
5	Classify the head losses in pipe flows and skill seeing of measurement of flows.

Signature of HOD

Date:

Signature of faculty

Date:18-2-2022

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COURSE OUTCOMES

Academic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech ……II…… Year: …2021-22…….. Section: A

Course/Subject: …… INTRODUCTION FLUID MECHANICS…… Course Code: GR15A2007

Name of the Faculty: …… S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

The expected outcomes of the Course/Subject students shall able to:

S.No	Course Outcomes
1	1. Comprehend the various fluid properties and fluid statics .
2	2. Understand the broad principles of hydrostatic forces on submerged planes
3	3. Analyzing fluid dynamics and kinematics.
4	4. Classify concept of boundary layer and predict the laminar and turbulent flows
5	5. Predict the losses in pipes flows and able to calculate discharge measurement

Signature of HOD

Date:

Signature of faculty

Date

Gokaraju Rangaraju Institute of Engineering & Technology

Bachupally, Nizampet Road, Kukatpally, Hyderabad-500009

B.Tech Civil Engg. II Yr-II Sem - GR 20 A.Y: 2021 -22

S.No	Reg No	Student Name
1	20241A0101	AADHI SRIKAR RAO
2	20241A0102	ABHIRAM SAI YADAV JANGITI
3	20241A0103	BACCHUGUDAM RITHVIK REDDY
4	20241A0104	BANDLA NAVEEN
5	20241A0105	B.PRANAV SAI
6	20241A0106	BHATTU SUPREETH CHAKRAVARTHY
7	20241A0107	BHUPATHIRAJU HIMANTHAVARMA
8	20241A0108	BOINI HEMANTH
9	20241A0109	CHALLA AJAY KUMAR
10	20241A0110	DONABOINA SRI HARI
11	20241A0111	EPPA ARNAV
12	20241A0112	G L N RAGHURAMAN
13	20241A0113	GANDLA HARSHITH KUMAR
14	20241A0114	GUGGILLA SHASHANK
15	20241A0115	GUNDA SRIKANTH
16	20241A0116	JANGILI SRAVAN KUMAR
17	20241A0117	JANJIRALA SRUTHI
18	20241A0118	JARAPULA JAYANTH
19	20241A0119	K NIKHITHA
20	20241A0121	K.KONDAL
21	20241A0122	KAMMAMPATI UDAYKIRAN
22	20241A0123	KARNE SRITHAN
23	20241A0124	KUNCHALA VARUN KUMAR
24	20241A0125	KUNTA NITHIN REDDY
25	20241A0126	M PAVAN KALYAN
26	20241A0127	MERE MAHESH
27	20241A0128	MOHAMMED AHMED
28	20241A0129	MOTHUKURI LAXMAN
29	20241A0130	MOTTADI ADITYA TEJA
30	20241A0131	MULA SUSHMA SRI
31	20241A0132	NAYINI SWETHA
32	20241A0133	PAIDIPALLY BHARATH
33	20241A0134	P.SAI KIRAN REDDY
34	20241A0135	PASNOOR PAVAN PRATHAP REDDY
35	20241A0136	PATHLAVATH SHIVA NAYAK
36	20241A0137	PEDDIBOINA ANUSHA
37	20241A0138	POREDDY ABHINAV REDDY
38	20241A0139	PULLAGURA SANTHOSH
39	20241A0140	RACHALA BHARATH
40	20241A0141	RADHARAPU SHAJI KUMAR
41	20241A0142	RAMAVATH ROJA
42	20241A0143	RATHLAVATH SAIRAM NAYAK
43	20241A0144	RAVI TEJA PASUNUTHI
44	20241A0146	SADDI SHRIANK REDDY
45	20241A0147	SATHVIKA NARLA
46	20241A0148	SOKKULA KOUSHIKREDDY
47	20241A0149	SRIRAM PANDAVULA
48	20241A0150	T.BHARGAVI
49	20241A0151	T.BHUVANESHWARI
50	20241A0152	S.TEJA RETIESH REDDY
51	20241A0153	TEJAVATH KALYANI
52	20241A0154	TELLAPURAM PRUDHVI RAJ
53	20241A0155	THADEM ROHITH
54	20241A0156	THUMMALA RAJASHEKAR
55	20241A0157	UVSGR KAMESWARA SAI KARTHIK
56	20241A0158	SREERAM VATTEM
57	20241A0159	V VIKESH
58	20241A0160	VENNAM SRIKAR
59	21245A0101	GUMADAVELLI ARUN KUMAR
60	21245A0102	KADIRABAD SRIRAM
61	21245A0103	MANIKONDA NIKITHA
62	21245A0104	PARIDULA PRATHYUSHA
63	21245A0105	PATERU MOUNA

Guidelines to Study The Course Books and References

Course Design and Delivery

Reference Books/suggested
Fliud Mechanics by J.F.Douglas, J.M Gaserek and j. A Swaffirld

Text Books	
1	Fliud Mechanics By Modi And Seth , Standard Book House
2	Open Channel Flows By S.K Subramanya
3	Introduction To Fluid Mechanics By Edward J.Shaughnessy, Jr.Iram.Katz And James PSchaffer, Oxfard University Press, New Yark, New Delhi
4	Text Book Of Fluid Mechanics And Hydraulics Machines By Dr.R.K.Bansal Laxmi Publication New Delhi
5	Hydraulic Machines By SK Banga And Sharma
Fliud Mechanics by Frank White(TaTamc. Grawhill pvt.Ltd)	
Fliud Mechanics by A.K Mohanty, prentice hall of india pvt.Ltd, New Delhi	
Fliud Mechanics and Hydraulics machines by Rajput	

Websites	
1	NPTEL : Civil Engineering - Hydraulics **nptel**.ac.in/courses/105103096/ Introduction to**Hydraulics** · Open Channel **Hydraulic** Part - 1 · Open Channel **Hydraulics** ..
2	Hydraulics - NPTEL PHASE 2 - Courses **nptel**.ac.in/video.php? subjected =105103096 **Hydraulics** (Video) >> 1
3	**nptel**.ac.in/courses/Webcourse.../IIT.../**machine**/.../Course_home-lec1a.ht..
4	www.youtube.com/watch?v=z9wsUWaN

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COURSE SCHEDULE

Academic **Y**ear : 2021-22
Semester : I
Name of the Program: B.Tech II Year Section: A
Course/Subject: ……FLUID MECHANICS…… Course Code: …… GR20A2012
Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING
Designation : ASSISTANT PROFESSOR.
The Schedule for the whole Course / Subject is:

		Duration (Date)		Total No.
S. No. S. No.	Description Description	From	To	Total No. Of Periods Of Periods
1.	Unit I- Dimensions and units physical properties of fluids specific gravity,viscosity,surface tension,vapor pressure and their influences on fluid motion pressure at a point,pascal law, atmospheric ,gauage and vacuum pressure, measurement of pressure, pressure gauage, manometer, dfferemntial and micro manometer.	7/10/21	20/10/21	11
2.	Unit II -hydrostatic forces on submerged plane,horizontal,vertical,inclined and curved surface, center of pressure derivation and problems.	21/10/21	30/10/21	9
3.	Unit III FLUID KINEMATICS Description of fluid flow , stream line pathline and streak line and stream tube classification of flows steady, unsteady uniform non uniform laminar and turbulent rotational irrotational flows equation ofContinuity for one two three dimensional flows stream and velocity potential function flow net analysis FLUID DYNAMICSSurface and body-forces–euler and bernoullies equation for flow along a stream line for 3D flow (Navier stokes equation explanationary)momentum equation and its application forces on pipe bend.	3/11/21	5/1/21	14
4.	BOUNDARY LAYER THEORYApproximate solution of navierstokes equation boundary layer concept prandtl contribution, character stics of boundary layer	9/12/21	30/12/21	16

	along a thin flat plate, vonkormen momentum integral equation la minar and turbulent boundary layer no derivation boundary layer in transition sepa ration of boundary layer flow around the submerged objects drag and lift magnus effect. LAMINOR ANDLAMINAR AND TURBULENT FLOWS,Reynolds experiment ,Characteristics of Laminar flows and Turbulent Flows,Flows between parallel plate,Flows through the long tubes,Flow through inclined tubes,			
5.	CLOSED CONDUIT FLOW Law of fluid friction darcy equation minor losses pipes in series pipes parallel total energy line and hydraulic energy line . pipe network and problem variation of friction factor with the Reynolds number Moody chart. MEASUREMENT OF FLOWS Pitot tube venturimeter and orifice meter classification of orifice, flow over a rectangle, triangle and trapezoidal and stepped notches and broad crested weir.	5/1/22	19/1/22	7
6	Revision	20/1/22	29/1/22	4

Total No. of Instructional periods available for the course: ..……61…. Hours / Periods

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SCHEDULE OF INSTRUCTIONS

UNIT PLAN

Academic **Y**ear : 2021-22
Semester : I / II UNIT NO.: ……I……
Name of the Program: B.Tech ……II…… Year: …2021-22…….. Section: A/B
Course/Subject: INTRODUCTION TO FLUID MECHANICS…….. Course Code: GR20A2012
Name of the Faculty: … S.VENKAT CHARYULU……..Dept.: CIVIL ENGINEERING
Designation: ASST.PROFESSOR

Lesson No.	Date	No. of Periods	Topics / Sub-Topics	Objectives &Outcomes Nos.	**Blooms Taxonomy**	References (Text Book, Journal…) Page Nos.: from to ____
1.	6/10/21	1	Dimensions and units introduction to fluid mechanics	Cob1 & C01	K3	Fluid Mechanics and Hydraulic Machines (FM&HM)Dr PN Modi &DrSM Seth, 4

2.	7/10/21	1	Physical properties of fluids: specific gravity, viscosity,	Cob1 & C01	K2	Fluid Mechanics and Hydraulic Machines by Dr.RkBansal 2 -10
3.	7/10/21	1	surface tension, vapor pressure - their influences on fluid motion	Cob1 & C01	K3	Fluid Mechanics and Hydraulic Machines by Modi &Seth12-21
4.	9/10/21	1	Pressure at a point, Pascal's law - - Pressure gauges, and Micro Manometers r problems	Cob1 & C01	K2	FM&HM by Dr.Rk Bansal 35,42-55
5.	9/10/21	1	Hydrostatic law problems	Cob1 & C01	K4	F.M and HM by Dr. R.k Bansal 37-41
6.	13/10/21	1	Atmospheric, gauge and vacuum pressure –.	Cob1 & C01	K2	FM&HM by Dr PN Modi &DrSM Seth 52
7.	14/10/21	1	measurement of pressure problems	Cob1 & C01	K2	FM&HM by Dr PN Modi &DrSM Seth 73
8.	14/10/21	1	measurement of pressure problems	Cob1 & C01	K2	FM&HM by Dr PN Modi &DrSM Seth 76
9.	16/10/21	1	Differential Manometers problem	Cob1 & C01	K4	FM&HM by Dr PN Modi &DrSM Seth79
10.	16/10/21	1	Pressure gauges Manometers classification	Cob1 & C01	K3	FM&HM by Dr PN Modi &DrSM Seth 69
11	16/10/21	1	Pressure gauges nom eters classification problems	Cob1 & C01	K3	FM&HM by Dr PN Modi &DrSM Seth 69
12	20/10/21	1	Differential Manometers problem	Cob1 & C01	K4	FM&HM by Dr PN Modi &DrSM Seth79
13	20/10/21	1	Micro Manometer expression	Cob1 & C01	K2	FM&HM by Dr PN Modi &DrSM Seth79

Signature of HOD
Date:

Signature of faculty
Date:

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SCHEDULE OF INSTRUCTIONS

UNIT PLAN

Academic **Y**ear : 2021-22
Semester : I / II UNIT NO.: …II……..
Name of the Program: B.Tech ……II…… Year: ……2021-22…….. Section: A
Course/Subject: …INTRODUCTION .TO. FLUID MECHANICS….Course Code: GR20A2012
Name of the Faculty: … S.VENKAT CHARYULU……..Dept.: CIVIL ENGINEERING
Designation: ASSISTANT .PROFESSOR

Lesson No.	Date	No. of Periods	Topics / Sub-Topics	Objectives & Outcomes Nos.	**Blooms Taxonomy**	References (Text Book, Journal…) Page Nos.: ____to ____
1.	21/10/21	1	Hydrostatic forces introduction of statics kinematics and dynamic forceson plane and - center of pressure. problems.	Cob2 & C02	K2	FM&HM by Dr PN Modi &Dr.SM Seth 99 F.M and HM by Dr. R.k Bansal 69
2.	21/10/21	1	Hydrostatic forces on horizontal submerged plane Derivation	Cob2 & C02	K4	F.M and HM by Dr. R.k Bansal 85-86
3.	23/10/21	1	Hydrostatic forces on Vertical submerged plane Derivation	Cob2 & C02	K5	F.M and HM by Dr. R.k Bansal 69-72
4.	23/10/21	1	Hydrostatic forces on inclined submerged plane	Cob2 & C02	K4	F.M and HM by Dr. R.k Bansal 86-88
5.	27/10/21	1	Hydrostatic forces on curved Submerged plane derivation	Cob2 & C02	K5	F.M and HM by Dr. R.k Bansal97-99
6.	27/10/21	1	Problems on Horizontal submerged surface	Cob2 & C02	K5	F.M and HM by Dr. R.k Bansal 85
7	28/10/21	1	Problems on vertical submerged surface	Cob2 & C02	K3	F.M and HM by Dr. R.k Bansal 70
8	28/10/21	1	Problems on inclined submerged surface	Cob2 & C02	K4	F.M and HM by Dr. R.k Bansal 97
9	30/10/21		Problems on inclined submerged surface	Cob2 & C02	K5	F.M and HM by Dr. R.k Bansal 97

Signature of HOD
Date:

Signature of faculty
Date:

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SCHEDULE OF INSTRUCTIONS

UNIT PLAN

Academic **Y**ear : 2021-22

Semester : I / II UNIT NO.: …III…….

Name of the Program: B.Tech ……II…… Year: ……2021-22…….. Section: A/B

Course/Subject: …… FLUID MECHANICS… …….. Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU…….Dept.: CIVIL ENGINEERING

Designation: ASST.PROFESSOR

Lesson No.	Date	No. of Period ds	Topics / Sub-Topics	Cobjectives & Outcomes Nos.	**Blooms Taxonomy**	References (Text Book, Journal…) Page Nos.: ____to ____
1.	6/11/2021	1	**FLUID KINEMATICS:** Description of fluid flow	Cob3 & C03	K2	K2
2.	6/11/2021	1	Stream line,path line and streak lines, stream tube. problems	Cob3 & C03	K5	F.M & HM by Dr PN Modi &Dr.SM Seth 272
3.	10/11/21	1	Classification of flows Steady, unsteady uniform non-uniform,laminar, turbulent, rotational and irrotational flows -	Cob3 & C03	K5	F.M & HM by Dr. R.k Bansal 163-66 & by Dr PN Modi &Dr.SM Seth 238
4.	11/11/21	1	Steady, unsteady problems	Cob3 & C03	K5	F.M & HM by Dr. R.k Bansal172-174
5.	11/11/21		rotational and irrotational flows	Cob3 & C03	K5	F.M & HM by Dr. R.k Bansal 258
6.	13/11/21	1	Equation of continuity for one, two and three dimensional flows.	Cob3 & C03	K5	F.M & HM by Dr PN Modi &Dr.SM Seth 269
7.	13/11/21	1	Equation of continuity problems	Cob3 & C03	K5	F.M & HM by Dr PN Modi &Dr.SM Seth267
8.	17/11/21	1	Stream ,velocity potential functn, flownet analysis problems	Cob3 & C03	K5	F.M & HM by Dr. R.k Bansal166-70,75-80, 84-91
9.	18/11/21	1	**FLUID DYNAMICS:** Surface and body forces problems	Cob3 & C03	K5	F.M & HM by Dr. R.k Bansal 259 by Dr PN Modi &Dr.SM Seth292 293
10.	18/11/21	1	Euler's and Bernoulli's equations for flow along a stream line	Cob3 & C03		F.M & HM by Dr. R.k Bansal 259-61
11	26/11/21	1	Navier stokes equations (Explanation) problems	Cob3 & C03		F.M & HM by Dr PN Modi &Dr.SM Seth294

12	26/11/2021	1	Momentum equation and itsapplication	Cob3 & C03		F.M & HM by Dr. R.k Bansal288 Modi &Dr.SM Seth358-63
13.	1/12/21		forces on pipe bend problems	Cob3 & C03		Dr PN Modi &Dr.SM Seth 363
14	8/12/21	1	Problems on various models.	Cob3 & C03		F.M & HM by Dr. R.k Bansal261,66-68,98-300

Signature of HOD
Date:

Signature of faculty
Date:

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SCHEDULE OF INSTRUCTIONS

UNIT PLAN

Academic **Y**ear : 2021-22
Semester : I / II UNIT NO.: …IV……
Name of the Program: B.Tech ……II…… Year: ……2021-22…….. Section: A
Course/Subject: …… FLUID MECHANICS… Course Code: GR20A2012
Name of the Faculty: … S.VENKAT CHARYULU……..Dept.: CIVIL ENGINEERING
Designation: ASST.PROFESSOR

Lesson No.	Date	No. of Periods	Topics / Sub-Topics	Cobjectives & Outcomes Nos.	**Blooms Taxonomy**	References (Text Book, Journal…) Page Nos.: ____to ____
1.	9/12/21	1	**BOUNDARY LAYER THEORY:** Approximate Solutions of Navier Stoke's Equations	Cobs: 4 Cos:4	K5	F.M & HM by Dr. R.k Bansal 611 F.M & HM by Dr PN Modi &Dr.SM Seth
2.	8/12/21	1	Boundary layer - concepts, Prandtl contribution problems	Cobs:4 Cos:4	K5	F.M & HM by Dr. R.k Bansal438,568,667-72
3.	11/12/21	1	Characteristics of boundary layer along a thin flat plate problems	Cobs:4 Cos:4	K5	F.M & HM by Dr. R.k Bansal612 -16
4.	15/12/21	1	Vonkarmen momentum integral equation,	Cobs:4 Cos:4	K5	F.M & HM by Dr PN Modi &Dr.SM Seth
5.	16/12/21	1	Laminar and turbulent Boundary layers(no deviations), problems	Cobs:4 Cos:4	K5	F.M & HM by Dr. R.k Bansal638-48

6.	18/12/21	1	BL in transition separation of BL, control of BL, flow around submerged problems	Cobs: 4 Cos:4	K5	F.M & HM by Dr. R.k Bansal 648-51 F.M & HM by Dr PN Modi &Dr.SM Seth579-84
7.	22/12/21	1	Cobjects-Drag and Lift- Magnus effect. Problems	Cobs:4 Cos:4	K2	F.M & HM by Dr. R.k Bansal658-787
8.	23/12/21	1	**laminar & turbulent flows:** reynold's experiment characteristics of laminar turbulent flows.	Cobs:4 Cos:4	K5	F.M & HM by Dr. R.k Bansal 433,387,433 FM & HM by Dr PN Modi &Dr.SM Seth
9.	25/12/21	1	Flow betweenPlates Flow through long tubes	Cobs:4 Cos:4	K4	F.M & HM by Dr PN Modi &Dr.SM Seth602-10,14-17
10.	29/12/21	1	flow through inclined tubes. Derivation and problems	Cobs:4 Cos:4	K5	F.M & HM by Dr PN Modi &Dr.SM Seth645
11	30/12/21	1	Problems on varius models	Cobs:4 Cos:4	K3	F.M & HM by Dr. R.k Bansal56-57
12	9/12/21	1	Problems on varius models	Cobs:4 Cos:4	K5	F.M & HM by Dr. R.k Bansal 400,419,427-29
13.	8/12/21	1	Problems on varius models	Cobs:4 Cos:4	K4	F.M & HM by Dr. R.k Bansal 448-450,53-62
14	11/12/21	1	Problems on varius models	Cobs: 4 Cos:4	K5	F.M & HM by Dr. R.k Bansal 453-62

Signature of HOD

Date Date

Signature of faculty

Date Date

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Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

SCHEDULE OF INSTRUCTIONS

UNIT PLAN

Academic **Y**ear : 2021-22
Semester : I / II UNIT NO.: …V……
Name of the Program: B.Tech ……II…… Year: ……2021-22…….. Section: A
Course/Subject: …… FLUID MECHANICS… Course Code: GR20A2012
Name of the Faculty: … S.VENKAT CHARYULU……..Dept.: CIVIL ENGINEERING
Designation: ASST.PROFESSOR

Lesson No.	Date	No. of Periods	Topics / Sub-Topics	Cobjectives & Outcomes Nos.	**Blooms Taxonomy**	References (Text Book, Journal…) Page Nos.: ____to ____
1.	5/1/22	1	**closed conduit flow:** laws of fluid friction - Darcy's equation, minor losses	Cob5 & C05	K3	F.M & HM by Dr. R.k Bansal465
2.	6/1/22	1	pipes in series - pipes in parallel Pipe network problems	Cob5 & C04	K5	F.M & HM by Dr. R.k Bansal 498-502,,508-9
3.	8/1/22	1	Total energy line and hydraulic gradient line	Cob5 & C05	K5	F.M & HM by Dr. R.k Bansal 491--498,
4.	12/1/22	1	variation of friction factor with Reynolds's number - Moody's Chart.	Cob5 & C04	K5	F.M & HM by Dr PN Modi &Dr.SM Seth673,83
5.	13/1/22	1	measurement of flow: pitot tube, venturi meter	Cob5 & C05	K5	F.M & HM by Dr. R.k Bansal 268-278
6.	15/1/22	1	measurement of flow: pitot tube, venturimeter	Cob5 & C05	K5	F.M & HM by Dr. R.k Bansal 278-88,
7.	19/1/22	1	orifice meter - classification of orifices, flow over rectangular, triangular	Cob5 & C05	K4	F.M & HM by Dr. R.k Bansal317-19
8.	20/1/22	1	trapezoidal and Stepped notches -Broad crested weirs.	Cob5 & C05	K4	F.M & HM by Dr. R.k Bansal 448-450, 328, 358-61, 61-63
9.	20/1/22	1	Pitot tube, Venturi meter	Cob5 &	K5	F.M & HM by Dr. R.k Bansal 286-88

				C05		
10.	22/1/22	1	orifices, flow over rectangular	Cob5 & C07	K3	F.M & HM by Dr. R.k Bansal319,31-321
11	22/1/22	1	pipes in series - Problems	Cob5 & C07	K5	F.M & HM by Dr. R.k Bansal503-7
12	26/1/22	1	pipes in parallel Problems	Cob5 & C07	K5	F.M & HM by Dr. R.k Bansal 509-14
13.	27/2/22	1	Total energy line Problems	Cob5 & 7	K5	F.M & HM by Dr. R.k Bansal 498-99

Signature of HOD
Date:

Signature of faculty
Date:

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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SCHEDULE OF INSTRUCTIONS

COURSE PLAN

Academic **Y**ear : 2021-22

Semester : I UNIT NO.: ……I……

Name of the Program: B.Tech ……II…… Year: …2022…….. Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS… … Course Code: : GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

unit	BTL			No. of	Description
I	2	.1	6/10/21	1	Dimensions and units introduction to fluid mechanics
	3	2	7/10/21	1	Physical properties of fluids: specific gravity, viscosity,
	2	3	7/10/21	1	surface tension, vapor pressure - their influences on fluid
	3	4	9/10/21	1	Pressure at a point, Pressure gauges, Manometers r
		5	9/10/21	1	Pascal's law ,Micro Manometers r problems
	2	6	13/10/21	1	Hydrostatic law problems
	3	7	14/10/21	1	Atmospheric, gauge and vacuum pressure –.
	2	8	14/10/21	1	measurement of pressure problems
	2	9	16/10/21	1	Pressure gauges Manometers classification
	2	10	16/10/21	1	Differential Manometers problem
	3	11	20/10/21	1	Micro Manometer expression
II	3	12	21/10/21	1	Inclined manometer
	3	13	21/10/21	1	Inverted manometer
	2	14	23/10/21	1	Hydrostatic forces introduction of statics kinematics
	3	15	23/10/21	1	Hydrostatic forces on horizontal submerged plane
	3	16	27/10/21	1	Hydrostatic forces on Vertical submerged plane
	3	17	28/10/21	1	Hydrostatic forces on inclined submerged plane
	2	18	28/10/21	1	Hydrostatic forces on curved Submerged plane derivation
	3	19	30/10/21	1	Problems on Horizontal submerged surface
III	2	20	30/10/21	1	Problems on vertical submerged surface
	2	21	3/11/200	1	Problems on inclined submerged surface
	2	22	4/11/202	1	**FLUID KINEMATICS:** Description of fluid flow
	2	23	4/11/202	1	Stream line,path line and streak lines, stream tube.
	3	24	6/11/202	1	Classification of flows Steady, unsteady uniform non-
	3	25	6/11/202	1	Steady, unsteady problems
	2	26	10/11/21	1	rotational and irrotational flows
	2	27	11/11/21	1	Equation of continuity for one, two and three
	3	28	11/11/21	1	Equation of continuity problems
	2	29	13/11/21	1	Stream ,velocity potential function, flownet analysis
	2	30	13/11/21	1	**FLUID DYNAMICS:** Surface and body forces

	3	31	17/11/21		Euler's and Bernoulli's equations for flow along a stream
	2	32	18/11/21	1	Navier stokes equations (Explanation) problems
	2	33	18/11/21	1	Momentum equation and its
	3	34	26/11/21	1	forces on pipe bend problems
	2	35	26/11/20	1	**BOUNDARY LAYER THEORY:** Approximate
	2	36	1/12/21	1	Boundary layer - concepts, Prandtl contribution
	3	37	8/12/21	1	Characteristics of boundary layer along a thin flat plate
	2	38	9/12/21	1	Vonkarmen momentum integral equation,
	3	39	8/12/21	1	Laminar and turbulent Boundary layers(no deviations),
	2	40	11/12/21	1	BL in transition separation of BL, control of BL, flow
	2	41	15/12/21	1	objects-Drag and Lift- Magnus effect. Problems
	2	42	16/12/21	1	**laminar & turbulent flows:** reynold's experiment
	3	43	18/12/21	1	Flow between Plates Flow through long tubes
	2	44	22/12/21	1	flow through inclined tubes.
	2	45	23/12/21	1	Problems on varius models
	3	46	25/12/21	1	Problems on varius models
	2	47	29/12/21	1	Problems on varius models
	3	48	30/12/21	1	Problems on varius models
	3	49	5/1/22	1	**closed conduit flow:** laws of fluid friction - Darcy's
	3	50	6/1/22	1	pipes in series - pipes in parallel Pipe network problems
	3	51	8/1/22	1	Total energy line and hydraulic gradient line
	2	52	12/1/22	1	measurement of flow: pitot tube, venturi meter
	3	53	13/1/22	1	measurement of flow: pitot tube, venturimeter
	2	54	15/1/22	1	orifice meter - classification of orifices, flow over
	3	55	19/1/22	1	trapezoidal and Stepped notches -Broad crested weirs.
	2	56	20/1/22	1	Pitot tube, Venturi meter
	2	57	20/1/22	1	orifices, flow over rectangular
	2	58	22/1/22	1	pipes in series - Problem
	3	59	22/1/22	1	pipes in parallel Problem
	3	60	26/1/22	1	Total energy line Problem
	3	61	27/1/22	1	hydraulic gradient line Problem

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 4/10/21
Semester : I
Name of the Program : B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……1…… Duration of Lesson: 1hr ……

Lesson Title: …… Dimensions and units introduction to fluid mechanics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :
1. Classify units and dimensions of various physical quantities
2. Discusss the various systems of units
3. Explain the fluids definition, solids, liquids and gases

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Dimensions of physical quantitites such as force,velocity,acceleration,torque,etc
System of units expressed MKS,CGS,FPS system and their conversions.
Definition of fluid statics,dynamics and kinematics
Classification of matter and molecular arrangement

Assignment / Questions: Q.)what is the dimentions of viscosity, force and kinematic viscosity?
2.Asst.) what is different types of system of units? Discuss
3.) Convert a pressure head of 350 kn/m^2 of an oil mass density 500 kg/m^3 into meters
4) Express 20.2m in water in kg/cm^2

Course bjectives: 1 course Outcomes : 1

Signature of faculty

LESSON PLAN

Academic Year : 2021-22 Date: 5/10/21

Semester : I

Name of the Program : B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……2…… Duration of Lesson: 1hr

Lesson Title: …… Physical properties of fluids: specific gravity, viscosity,

INSTRUCTIONAL/LESSON OBJECTIVES:

Physical properties of fluids: specific gravity, viscosity,

On completion of this lesson the student shall be able to:

1. Enumerate of various physical properties

2. what do u understand the specific gravity ,viscosity ?

3. Explain the fluid mass density, weight density,

4. compute on mass density, weight density related given data

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Properties of fluid. Viscosity fo fluids, Classification of fluids Newtonian ,non Newtonian,thixotropic plastic,idel fluids etc. Newton law of viscosity Problems on viscosity

Assignment / Questions: 1. Q.)what is viscosity, realation with kinematic viscosity?

2.Asst.) what is different types of fluids? Discuss

3.If the velocity of profile of a fluid over a plate is parabolic with the vertex of 30 cm from the plate ,where the velocity is 140 m/sec .calculate thee velocity of gradients and sheer stress at a distance of 0,20 and 25 cm from the plate ,if the viscosity of the fluid is 9.5poise.

course objectives: 1 Course Outcomes : 1

Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 6/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……3…… Duration of Lesson: 1hr ……

Lesson Title: ……surface tension, vapor pressure - their influences on fluid motion

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be Able to

1. Explain the surface tension, vapor pressure - their influences on fluid motion

2. understand the tension influences on fluid motion

3. Identify the fluid of surface tension,vapour pressure In real where it is exist

4. Calculate the problems on surface tension .

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Surface tension for droplet, soap bubble, liquid jet, and related formulas and problems Vapor pressure, actual existence. Compressibility

Assignment / Questions: 1. Q.)what is surface tension write different cases?

2.Asst.) what is vapor pressure? Discuss

3. Calculate the capillary effect in millimeters in a glass tube of 5 mm diameter , when immersed in (i) water ,and (ii) mercury . the temper rapture of liquid is 20^0 c and the values of the surface tension of the water and mercury at 20^o c is in contact with air are 0.073575 n/m and 0.51 N/m respectively . the angle of contact for water is zero that for mercury 1.30^0 .take the density of water at 20^0c as equal to 998 kg/m^3.

Signature of faculty

Course bjectives: 1 course Outcomes : 1

LESSON PLAN

Academic **Y**ear : 2021-22 Date:6/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR
Lesson No: ……4…… Duration of Lesson: 1hr ……
Lesson Title: …… Pressure at a point, Pascal's law Pressure gauges, and Micro Manometers r problems

INSTRUCTIONAL/LESSON OBJECTIVES:
On completion of this lesson the student shall be :

1 Enumerate Pressure at any point,

2. Ddifferentiated the purpose of the Pascal's law

3. Illustrate to explain the Pressure gauges useages and measurements

4. Identified the Different function of Micro manometer, Manometers r problems

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Definition and derivation Pascal law. Manometers their classification. simple manometer, piezometer etc Micromanometer

Assignment / Questions: 1. Q.)what is Pascal law?
2.Asst.) what is different types of manometers? Discuss
3. Calculate pressure due to the Column of 0.3 of (a)water (b)an oil of sp . gr . 0.8 , and (C) mercury of sp .gr .13.6. take density of water $\rho = 1000\ kg/m^3$.

Course objectives: 1 Course Outcomes : 1

LESSON PLAN

Academic **Y**ear : 2021-22 Date:7/10/21

Semester : I
Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……5…… Duration of Lesson: 1hr ……

Lesson Title: …Hydrostatic law

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to

1. Discuss the Hydrostatic law
2. Illustrate by the solving the static fluid problem and explain
3. Distinguish static fluids
4. Define fluid statics and dynamics

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Hydrostatic law definition solving the fluid problems Hydrostatic law derivation solving the static fluid problems

Assignment / Questions: 1. Q.)what is the hydrostatic law ?
2.Asst.) An open tank contains water up to depth of two meters above it in an oil of sp.gr . 0.9 for a depth of 1 m . find the pressure intensity (i) at the inter face of the two liquids, and (ii) bottom of the tank .

Course objectives: 1 course Outcomes : 1 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 7/10/21
Semester : I
Name of the Program: B.Tech II Year Section: A
Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……
Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING
Designation: ASSISTANT PROFESSOR
Lesson No: ……6…… Duration of Lesson: 1hr ……
Lesson Title: ……Atmospheric, gauge and vacuum pressure –.
INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. classify various system of units of atmospheric pressures

2. Disuses various gauge pressure.

3. Explain the fluids definition atmospheric pressure, gauge & vacuums pressure

4. solve atmospheric pressure, gauge and vacuum pressure problem as per the model given .

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Definition of atmospheric pressure, gauge and vacuum pressure Diagrametic representation. Absolute pressure

1. Assignment / Questions: 1. Q.) Calculate pressure due to the Column of 0.3 of (a) water (b) an oil of sp . gr . 0.8 , and (C) mercury of sp .gr .13.6. take density of water $\rho = 1000\ kg/m^3$.
2.Asst.) Explain difference between atmospheric , gauge and absolute pressure .

Course objectives: 1 course Outcomes : 1

Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date 7/10/21
Semester : I
Name of the Program: B.Tech II Year Section: A
Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……
Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING
Designation: ASSISTANT PROFESSOR
Lesson No: ……7…… Duration of Lesson: 1hr ……
Lesson Title: ……measurement of pressure and problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student can:

1. Assess measure the pressures using the differential manometer

2. Classify various pressure measurement instruments

3. Recognise the pressure measurement instruments

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Definition of pressure and its measurement. Classification of pressure measurement instruments.

Assignment / Questions: 1. Q.) A differential manometer connected at a two points A and B of two pipes and centre distance between them is 3m .the pipe A contains liquid of sp. gr . = 1.5 while the pipe B contains a liquid of sp . gr . =0.9 . the pressures A and B are 1kgf/cm^2 and 1.80 kgf/cm^2 respectively . Find the difference in mercury level in the differential manometer.

2.Asst.) A u tube manometer is used to measure the pressure of water in pipe line which is in excess of atmospheric pressure .the right limb of manometer contains mercury and is open to atmosphere . The contact between water and mercury is in the left limb . Determine the pressure of water in the main line, if the difference in level of mercury in the limbs of u tube is 10 cm and the free surface of mercury is in level with the centre of pipe. if the pressure of water in pipe line is reduced to 9810 N/m^2 , calculate the new difference in the level of mercury . sketch the arrangement in both cases. . Signature of faculty

Course objectives: 1 course Outcomes : 1

Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 8/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……8…… Duration of Lesson: 1hr …….

Lesson Title: ……Pressure gauges Manometers classification

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. can identify measure the pressure
2. Able to list various pressure measurement instruments
3. Ability to express the pressure measurement instruments

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Different gauges definitions Types of manometer derivations

Assignment / Questions: 1. Q.) A single column manometer is connected to a pipe containing a liquid of sp .gr. 0.9 as shown in the figure .2 .17 .find the pressure in the pipe if the area of the reservoir is 100 times the area of the tube for the manometer.the water columne reading in left limb is 20cm (from the heavy liquid surface in reservoir to center of pipe) and In the right limb is 40cm from the heavy liquid surface in reservoir to of open to atm.pressure, specific gravity of mercury is13 .6

2.Asst.) water is flowing through two different pipes to which an inverted differential manometer having n oil of sp . gr . 0.8 is connected . the pressure head in pipe a is 2m of water , find the pressure in the pipe B of manometer.reading of left water column and right water columnto the center of pipe ares 30cm and 12cm respectively. Lower level of heavy liquid is in the left limb.

Course objectives: 1 Course Outcomes : 1 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 9/10/21
Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……9…… Duration of Lesson: 1hr ……

Lesson Title: ……Differential Manometers problem

On completion of this lesson the student shall be :

1. Explain the measure the pressure using differential manometer
2. List various pressure measurement instruments
3. Describe pressure measurement instruments using Micro manometer
4. can compute various problems on pressure measurement

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Different gauges definitions Types of manometer derivations

Assignment / Questions: 1. Q.) Explain about u tube and differential manometer .

2.Asst.) Explain about simple column manometer

3. The right limb of the u-shaped manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe which a fluid of sp . gr .0.9 is flowing. The centre of pipe is 12 cm below the level of mercury in the right limb . find the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20 cm.

Course objectives: 1 Course Outcomes : 1 Signature of faculty

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ASSIGNMENT SHEET -1

Academic **Y**ear : 2021-22 Date: 9/10/21
Semester : I

Name of the Program: B.Tech …II……Year: …2017……..Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS ……

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No. …1…….

Q1. List and write briefly about fluid properties.

Q2. If the velocity of profile of a fluid over a plate is parabolic with the vertex of 20 cm from the plate ,where the velocity is 120 m/sec .calculate thee velocity of gradients and sheer stress at a distance of 0,10 and 20 cm from the plate ,if the viscosity of the fluid is 8.5poise.

Q3. How do you measure the pressure ? Discuss the different type of manometers.

Q4. An invertwd u tube manometer is connected to two horizontal pipes A and B through which water is flowing . the vertica; distance between the axis of these pipes is 30cm . when an oil of specific gravity 0.8 is used as a gauage field th vertical hehits of water column in the two limbs of the converted manmeter aree foud to be same and equal to 35cm determine the difference of pressure between the pipes.

Objective Nos.: ……1
Outcome Nos.: …1

Signature of HOD Signature of faculty

Date: Date:

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Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

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TUTORIAL SHEET - 1

Academic **Y**ear : 2021-22 Date: 21/7/21

Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No. 1

Q1. Calculate the dynamic viscosity of an oil, which is used for lubrication between a square plate of size 0.9 m x0.9m and an inclined plane with an angle of Inclination of 35^0 . The weight of square plate is 400 m and its slides down

Q2. Calculate the capillary effect in millimetres in a glass tube of 4 mm diameter , when immersed in (i) water ,and (ii) mercury . the temper rapture of liquid is 20^0 c and the values of the surface tension of the water and mercury at 20^o c is in contact with air are 0.073575 n/m and 0.51 n/m respectively . the angle of contact for water is zero that for mercury 1.30^0 .take the density of water at 20^0c as equal to 998 kg/m^3

Q3. The right limb of the u-shaped manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe which a fluid of sp . gr .0.9 is flowing. The centre of pipe is 12 cm below the level of mercury in the right limb . find the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20 cm.

Q4. water is flowing through two different pipes to which an inverted differential manometer having n oil of sp . gr . 0.8 is connected . the pressure head in pipe a is 2m of water , find the pressure in the pipe B of manometer.reading of left water column and right water columnto the center of pipe ares 30cm and 12cm respectively. Lower level of heavy liquid is in the left limb.

Objective Nos.: 1

Outcome Nos.: 1

Signature of HOD Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 9/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……10…… Duration of Lesson: 1hr …….

Lesson Title: …… Micro Manometers

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. predict the pressure and draw the micro manometer.
2. Draw micro manometer. And relate Reservoir
3. solve the problems on micro manometer. Having reservoir on both side assume suitable data

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Explain and draw the micro manometer. calculate the pressure using micro manometer. Problems on micro manometer.

Assignment / Questions: 1. Q.) Explain about simple column manometer?

2.Asst.) How do u measure pressure using micro manometer

Objective Nos.: 1 Outcome Nos.: 1 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 13/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……11…… Duration of Lesson: 1hr …….

Lesson Title: …… Micro Manometers

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Differentiate the micro manometer. And other manometers

2. compute the pressure in micro manometer.

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Explain and draw the micro manometer. calculate the pressure using micro manometer. Problems on micro manometer.

Assignment / Questions: 1. Q.) Explain about simple column manometer?
2.Asst.) How do u measure pressure using micro manometer

Objective Nos.: 1 Outcome Nos.: 1 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 14/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……12…… Duration of Lesson: 1hr ……..

Lesson Title: …… single column and other Manometers

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Explain and draw the Differential manometer.

2. compute the pressure in Differential manometer. Take 20cm son both sides .

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Explain and draw the micro manometer. calculate the pressure using micro manometer. Problems on micro manometer.

Assignment / Questions: 1. Q.) Explain about simple column manometer?
2.Asst.) How do u measure pressure using micro manometer

Objective Nos.: 1 Outcome Nos.: 1 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 14/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……13…… Duration of Lesson: 1hr …….

Lesson Title: …… Singlecolumnn manometer

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Analyze the single column manometer .

2. Compute the pressure in single column manometer with one side reservoir of 1/100 times

TEACHING AIDS : White Board /Marker TEACHING POINTS :

Explain and draw the micro manometer. calculate the pressure using micro manometer. Problems on micro manometer.

Assignment / Questions: 1. Q.) Explain about simple column manometer?
2.Asst.) How do u measure pressure using micro manometer

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 23/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR
Lesson No: ……14…… Duration of Lesson: 1hr …….

Lesson Title: ……Hydrostatic forces introduction of statics kinematics and dynamic forces on plane and - center of pressure.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Deduce Hydrostatic forces on statics fluids
2. Recognize pressure force on the given shape of a plane
3. Ccategorise, moment of inertia of various geometrical shapes

understand distinguish TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces
Introduction of statics kinematics and dynamic fluids and forces on plane
-Definition Of Center Of Pressure.
- Definition Of Total Pressure

Assignment / Questions: 1. Q.) Explain about Hydrostatic forces of statics fluids?
2.Asst.) Able to explain moment of inertia of various geometrical shapes
3. Pipe ' P ' contains carbon tetra chloride of sp.gr. 1.594 under a pressure of 1.05 kgf/cm^2 and 'Q' contains oil of sp.gr 0.8 and having the pressure equal to 1.75 kgf/cm^2 and manometric fluid is mercury. The height of liquid of sp.gr. 1.574 form P to the center of Q is 2.5m . The height liquid of sp.gr. form Q to the above mercury level in left limb is 1.5m. find the difference of levels of the mercury.

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date 23/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……15…… Duration of Lesson: 1hr ……..

Lesson Title: ……Hydrostatic forces on horizontal submerged plane Derivation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Assess Hydrostatic forces on horizontal submerged plane Derivation
2. Predict draw the Hydrostatic forces on horizontal submerged plane.

TEACHING AIDS : White Board /Marker the

TEACHING POINTS :

Hydrostatic forces on horizontal submerged plane Derivation problems

Assignment / Questions:
1. Q.)Derive Hydrostatic forces on horizontal submerged plane
2.Asst.)Define total pressure and center of pressure on horizontal submerged planes.

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 27/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……16…… Duration of Lesson: 1hr …….

Lesson Title: ……Hydrostatic forces on Inclined submerged plane Derivation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Derive Hydrostatic Forces On Vertical Submerged Plane Derivation
2. Explain And Draw Hydrostatic Forces On Inclined Submerged Plane.
3 Compute Inclined Submerged Plane Problems .

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces on vertical submerged plane Derivation

Assignment / Questions:

1. Q.)Derive Hydrostatic forces on vertical submerged plane

2.Asst.)Define total pressure and center of pressure on vertical submerged planes

3A concentric circle plate of diameter 3m with 1.5m diameter hole is immersed in water in such way that greatest and least depth below the free surface are 4m and 1.5m respectively. Determine the total pressure and center of pressure on one face of the plate

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date:28/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……17……Duration of Lesson: 1hr …….

Lesson Title: …Hydrostatic forces on inclined submerged plane

INSTRUCTIONAL/LESSON OBJECTIVES:

1. Analyse Hydrostatic forces on inclined submerged plane Derivation
2 Compare and draw Hydrostatic forces on inclined submerged plane.
4 Examine inclined submerged plane problems on circular planes, triangular plane s

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces on inclined submerged plane Derivation

Assignment / Questions:
1. Q.) Derive Hydrostatic forces on inclined submerged plane
2.Asst.) Define total pressure and center of pressure on inclined submerged planes

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 28/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……18…… Duration of Lesson: 1hr …….

Lesson Title: ……Hydrostatic forces on curved submerged plane derivation

INSTRUCTIONAL/LESSON OBJECTIVES:

1. Derive Hydrostatic forces on curved submerged plane Derivation
2. Discuss and draw Hydrostatic forces on curved submerged plane.
5 Compute curved submerged plane problems .

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces on curved submerged plane Derivation and various problems

Assignment / Questions:
1. Q.)Derive Hydrostatic forces on curved submerged plane
2.Asst.)Define total pressure and center of pressure on curved submerged planes

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date 30/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……19…… Duration of Lesson: 1hr …….

Lesson Title: ……Hydrostatic forces on horizontal submerged plane problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1 Calculate Hydrostatic forces on horizontal submerged plane on curved plane 3m from FS

2. Enumerate ,Hydrostatic forces on horizontal submerged plane 7m from FS

EACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces on horizontal submerged plane problems

Assignment / Questions:

1. Q. Determine the total pressure on circular plate of diameter 1.5 m which is placed vertically in water in such a way that a centre of the plate is 3m below the free surface of water . find the centre of pressure

2.Asst.)Define total pressure and center of pressure on horizontal submerged planes.

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 31/10/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR
Lesson No: ……20…… Duration of Lesson: 1hr …….

Lesson Title: ……Hydrostatic forces on Inclined submerged plane Derivation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Analyse Hydrostatic forces on veridical submerged plane Derivation
2. Discuss and draw Hydrostatic forces on inclined submerged plane. Of 45 degree
6 Evaluate inclined submerged plane problem from 30 degree with horizontal

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces on vertical submerged plane problems on circular, triangular and trapezoidal

Assignment / Questions:
1. Q.)Derive Hydrostatic forces on vertical submerged plane

2.Asst.)Define total pressure and center of pressure on vertical submerged planes

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 03/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……21…… Duration of Lesson: 1hr …….

Lesson Title: ……Hydrostatic forces on inclined submerged plane

INSTRUCTIONAL/LESSON OBJECTIVES:

1. Analyse Hydrostatic forces on inclined submerged plane Derivation
2. Effect on inclined planes

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces on inclined submerged plane derivation
Hydrostatic forces on inclined submerged plane Problems on circular, triangular and trapezoidal
Hydrostatic forces on inclined submerged plane model application

Assignment / Questions:

1. Q.)Derive Hydrostatic forces on inclined submerged plane
2.Asst.)Define total pressure and center of pressure on inclined submerged planes

Objective Nos.: 2 Outcome Nos.:2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 4/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……22…… Duration of Lesson: 1hr …….

Lesson Title: ……Hydrostatic forces on inclined submerged plane

INSTRUCTIONAL/LESSON OBJECTIVES:

1. enumerate,Hydrostatic forces on practical inclined submerged plane cases
2. Able to compute inclined submerged plane problems .

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Hydrostatic forces on inclined submerged plane derivation Hydrostatic forces on inclined submerged plane Problems circular, triangular and trapezoidal

Assignment / Questions:

1. Q.)Derive Hydrostatic forces on inclined submerged plane
2. Asst.)Define total pressure and center of pressure on inclined submerged planes

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090, (040) 6686 4440

ASSIGNMENT SHEET -2

Academic **Y**ear : 2021-22 Date 4/11/21

Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No. / Lesson …2 …….

This Assignment corresponds to Unit No. / Lesson …UNIT-II…….

Q1. Define the expression of total pressure and center pressure.

Q2 Obtain the Hydrostatic forces on vertical submerged planes.

Q3. A rectangular plane surface is 2 m wide and 3m deep . it lies in vertical plane in water . determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and coincides with water surface , (B) 2.5 m below the free water surface .

Q4 The find force on the disc in vertical si of tank having 3m diameter . head on horizontaldiameter is 4m and

Find torque applied to keep the disc in vertical position.

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

TUTORIAL SHEET - 2

Academic **Y**ear : 2021-22 Date: 4/11/21

Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No. 2

Q1. A circular opening. 3 m diameter, in a vertical side of a tank is closed by a disk of 3 m diameter which can rotate about a horizontal diameter . calculate : (i)the force on disc , and (ii) the torque required to maintain the disc in the equilibrium in the vertical position of water above the horizontal diameter is 4 m

Q2 Write down moment of inertia, area of diffraction geometrical planes.

Q3 A square aperture in the vertical side of a tank has one diagonal vertical and is completely covered by a plane hinged along one of the upper sides of aperture . the diagonals of the aperture ar 2m long and the tank contains a liquid of specific gravity 1.15 . the centre of aperture is 1.5 m below the free surface . calculate the thrust exerted on the plate by the liquid and position of its centre of pressure .

Q4 A cubical tank has sides of 1.5 m . it contains water for the lower 0.6 m depth . the upper remaining part is filled with oil of specific gravity 0.9 calculate for one vertical side of the tank : (i)total pressure and (ii)position of centre of pressure

Objective Nos.: 2

Outcome Nos : 2

Objective Nos.: 2 Outcome Nos.: 2 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 4/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S. VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……23…… Duration of Lesson: 1hr …….

Lesson Title: ……**FLUID KINEMATICS** Description of fluid flow

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Write the types of fluids
2. C**lassify** Langrangious, Euler fluid motion
3. Examine fluids velocity and acceleration.
4. Able to define fluid at space co ordinates.

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Types of fluid description Langrangious, Euler fluid motion Fluids velocity and acceleration. Fluid at space co ordinates

Assignment / Questions: 1. Q.) Explain types of fluid description
2.Asst.) Explain about Lagrangious, Euler fluid motion

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 06/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……24…… Duration of Lesson: 1hr …….

Lesson Title: …… Stream line, path line and streak lines, stream tube. problems1,2 ,6 &4,6,5

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Classify the types of fluid lines

2. Differentiate the stream tube Ability to express the streak line.

4 Predict the path lines

On completion of this lesson the student shall be :

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Types of fliud lines, the stream tube , streak line, path line Differences between the various fluid lines

Assignment / Questions:

Q.) 1. How do u identify the types of fliud lines

2 wh at do you understand the stream tube, streak line ?

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 06/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……25…… Duration of Lesson: 1hr …….

Lesson Title: Classification of flows Steady, unsteady uniform non-uniform,laminar, turbulent, rotational and irrotational flows

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. Elaborate the laminar flow
2. Summarize the turbulent ,rotational flows

On completion of this lesson the student shall be :

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

types of fluids,laminar flow, turbulent ,rotational flows ,irrigational , unsteady uniform non-uniform flows

Assignment / Questions: 1. Q.) 350 l/s of water is flowing in a pipe having a diameter of 500 mm . if the pipe is bent by 135 ^{0}(that is the change from initial to final direction is 135) , find the magnitude and diction of resultant force on the bend . the pressure of water flowing is 49.24 n/cm^2

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 10/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……26…… Duration of Lesson: 1hr …….

Lesson Title: Steady, unsteady problems

……

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :
1. Classify the study and unsteady
2.Compare the turbulent flows with other flows

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Steady, unsteady flows conditions.

Assignment / Questions: 1. Q.) Define the steady flow and unsteady flow 2,6&4,
2Q The diameters of a pipe at the sections 1 and 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5m/s determine velocity at section

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 11/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……27…… Duration of Lesson: 1hr …….

Lesson Title: rotational and irrotational flows

……

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :

1. How to identify the types of fluids mention practical application
2. What Do u understand by the rotational flow ? explain
3. Express the iirotational flows application

4. Differentiate the irrotational flows and rotational flow

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

rotational and irrotional flows Definitions and conditional problems

Assignment / Questions: 1. Q.) What is condition to flow become rotational and irrigational flows? 1,2&4,

2.Asst.) The velocity vector in a fluid flow is given $V=4x^3\ i-10x^2\ yz+2tk$ Find the velocity and acceleration of a fluid particle (2,1,3) at a time 1,2&4,6

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 13/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING
Designation: ASSISTANT PROFESSOR

Lesson No: ……28…… Duration of Lesson: 1hr…….
Lesson Title: Equation of continuity for one, two and three dimensional flows.
INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :
1. Derive one, two and three dimensional flows.
2. Analyze the Equation of continuity
3. Relate different forms of Equation of continuity ?

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Equation of continuity one, dimensional flows. two dimensional flows. three dimensional flows.

Assignment / Questions: 1. Q.) Derive Equation of continuity for one, two and three dimensional flow2,6&4,6, 2.Asst.) The following cases represent the two velocity components ,determine the third component of velocity such that they satisfy the continuity equat.ion u-2x+2y v=2x-2y

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 13/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……29…… Duration of Lesson: 1hr …….

Lesson Title: Equation of continuity for one, two and three dimensional flows.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be :
1. Mention one, two and three dimensional flows. In practical application
2. Illustrate problems on Equation of continuity flows

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Equation of 3D Continuity and various forms

Assignment / Questions: 1. Q.) The velocity potential function is given by $\emptyset = 5(x^2-y^2)$ Calculate the velocity components at the point (4,5)

2.Asst.) What is control volume? Define circulation

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 17/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……29…… Duration of Lesson: 1hr …

Lesson Title: … Stream ,velocity potential functn, flownet analysis problems …

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. classify the Stream, velocity potential function fluid flows

2. Recognize to solve problems on Stream, velocity potential function fluid flows

3. Explain Stream ,velocity potential function fluid flows

4. Summarize the Stream ,velocity potential function fluid flows

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Stream ,velocity potential function fluid flows flow net

Assignment / Questions:. 1Q.) explain Laplace equation for stream function Y1,
1Q.) explain Laplace equation for potential function Y1,

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 18/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU … ..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……30…… Duration of Lesson: 1hr …

Lesson Title: … **FLUID DYNAMICS:** Surface and body forces problems …

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. choose, Surface and body forces and discuss

2. classify to Surface and body forces with examples

4. Illustrate problems on the Surface and body forces

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

FLUID DYNAMICS: Surface and body forces problems discussion and illlustrations

Assignment / Questions:. 1Q.) explain the different body forces Y1,
1Q.) Determine the velocity at the point p(4,5) . Determine also the value of stream function Ψat point p .the stream of function for a two dimensional flow is given by $\Psi = 2xy$, calculate the velocity at the point (2,3) find the velocity potential function Ø .

Objective Nos.: 3 Outcome Nos.:3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 26/11/21
Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU c……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……31…… Duration of Lesson: 1hr …

Lesson Title: … Euler's and Bernoulli's equations for flow along a stream line
INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Define Bernoulli's equations for flow along a stream line
2. What is Euler's equations for flow along a stream line ?
3. classify the practical application on Euler's and Bernoulli's equations for flow along a stream line
4. knowledge of solving problems Euler's and Bernoulli's equations for flow along a stream line

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Euler's and Bernoulli's equations for flow along a stream line derivation Definition of Energy equation Problems

Assignment / Questions:. 1Q.) Derive Euler's and Bernoulli's equations for flow along a stream line Y1, 1Q.) define type of energy equations ,

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 26/11/21
Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: … INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……32…… Duration of Lesson: 1hr …

Lesson Title: … Nervier stokes equations (Explanation) problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Discuss about Navier stokes equations on real applications
2. illustrate Navier stokes equations with Example

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Navier stokes equations (Explanation problems and applications

Assignment / Questions:. 1Q.) explain the Navier stokes equations (Explanation) problems Y1,

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 1/12/21

semester : : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……33…… Duration of Lesson: 1hr …

Lesson Title: … Momentum equation and its application

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Momentum equation and its application
2. The Momentum equation and its application
3. Explain Momentum equation and its application
4. Enumarate on Momentum equation and its application especially 135 ^{0} pipe bend

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Momentum equation and its theory Derivation Momentum equation application of Momentum equation and its application

Assignment / Questions:. 1Q.) Explain the Momentum equation and its application Y1,

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 8/12/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……35…… Duration of Lesson: 1hr …

Lesson Title: INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Forces on pipe bend problems

2. Describe the forces on pipe bend problems

3. Explain forces on pipe bend problems

4. knowledge of solving problems forces on pipe bend problems

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

forces on pipe bend problems Resolving the forces on L shape bend V shape bend,135^0 shape bend

Assignment / Questions:. 1Q.) Explain the forces on pipe bend Y1,

2Q.) A 45˚ reducing bend is connected in a pipe line, the diameter at the inlet and outlet of the bend being 600mm and 30mm respectively , find the force exerted by water on bend if internal pressure at inlet to bend is $8.829 N/cm^2$ and rate of flow of water is 600 lit/sec.Y1,

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 9/12/2021

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……36…… Duration of Lesson: 1hr …
Lesson Title: Problems on various models

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:
1. identify Equation of continuity problems
2. describe the Stream ,velocity potential function, flow net analysis problems
3. explain Euler's and Bernoulli's equations for flow along a stream line
4. Evaluate problems on Navier stokes equations (Explanation) problems

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Equation of continuity problems
Stream ,velocity potential functn, flownet analysis problems
Surface and body forces problems
Euler's and Bernoulli's equations for flow along a stream line
Navier stokes equations (Explanation) problems

Assignment / Questions:. 1Q.) The stream function for a 2-D flow is given by $\Psi=2xy$. Calculate velocity at a point (2, 3).Find the velocity potential function φ,

2Q.) A 135˚ reducing bend is connected in a pipe line, the dia at the inlet and outlet of the bend being 700mm and 30mm respectively , find the force exerted by water on bend if internal pressure at inlet to bend is 10.829N/cm^2 and rate of flow of water is 900 lit/sec. ,

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 9/12/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……37…… Duration of Lesson: 1hr …

Lesson Title: … Boundary layer theory: approximate Solutions of Navier Stoke's Equations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Define Boundary layer theory flows
2. Describe the Boundary layer theory on flat plate
3. compute problems on Boundary layer theory Momentum thickness

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Boundary layer theory concept, Boundary layer theory control volume

Assignment / Questions:. 1Q.) explain Boundary layer theory concept Boundary layer theory separation
1Q.) explain Boundary layer theory control

Objective Nos.: 3 Outcome Nos.: 3 Signature of faculty

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ASSIGNMENT SHEET -3

Academic **Y**ear : 2021-22 Date:… : 9/12/21

Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A/B

Course/Subject: ……FLUID MECHANICS……

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No -III…… .

Q1. Write different types of flows. How to identify the type of flow.?

Q2. Determine the velocity at the point p(4,5) . determine also the value stream function at point p . the velocity potential function for a two dimensional flow is given by Ø = x(2y-1)

Q3 Derive the equation of Euler for the stream line.

Q4 A 30 cm diameter pipe conveys water branches in to 2 pipes of diameter 20cm and 15cm . if the average velocity in 30cm diameter pipe is 2.5m/s. find the discharge inthis pipe. Determine the Velocity in 15cm dia if velocity in 20cm dia pipe is 2m//s

Objective Nos.: 3, 5

Outcome Nos.: 3,2

Signature of faculty

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TUTORIAL SHEET - 3

Academic **Y**ear : 2021-22 Date: 9/12/21

Semester : I

Name of the Program: B.Tech …II……Year: …2017……..Section: A/B

Course/Subject: ……FLUID MECHANICS……..

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.
This Assignment corresponds to Unit No. 3

Q1. 250 l/s of water is flowing in a pipe having a diameter of 300 mm . if the pipe is bent by 135 ^{0}(that is the change from initial to final direction is 135) , find the magnitude and diction of resultant force on the bend . the pressure of water flowing is 39.24 n/cm^2

Q2 Derive Bernoulli's equitation for stream line

Q3 A horizontal venturimeter with inlet and throat diameter 30 cm and 15 cm respect is used to measure the flow of water .the reading of differential manometer connected to the inlet and the throat is 20 cm of mercury determine the rate flow take c_d=098

Q4 The velocity vector in a fluid flow is given $V=5x^3\, i-11x^2\, yz+3tk$ Find the velocity and acceleration of a fluid particle (3,2,4) at a time.

.

Objective Nos.: 3

Outcome Nos.: 3

Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date 9/12/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……38…… Duration of Lesson: 1hr …

Lesson Title: … Boundary layer - concepts, Prandtl contribution problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. identify Prandtl contribution problems
2. describe the Boundary layer - concepts, Prandtl contribution problems
3. explain Boundary layer - concepts, Prandtl contribution problems
4. solving problems Boundary layer - concepts, Prandtl contribution problems

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Boundary layer - concepts, Prandtl contribution problems ,shearstress, velocity distribution , mixed B.L, Boundary layer theory separation

Assignment / Questions:. 1Q.) Boundary layer - concepts, Prandtl contribution

1Q.) derive the momentum thickness, boundary layer thickness

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 15/12/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR
Lesson No: ……39…… Duration of Lesson: 1hr …

Lesson Title: … Characteristics of boundary layer along a thin flat plate problems
INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Differentiate Characteristics of boundary layer along thin flat plate problems

2. describe the Characteristics of boundary separation

3. Ability to explain Characteristics of boundary layer along thin flat plate problems

4. knowledge of solving problems Characteristics of boundary layer along a thin flat plate problems

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Characteristics of laminar boundary layer along a thin flat plate problems Characteristics of turbulent and transition boundary layer along a thin flat plate problem

Assignment / Questions:. 1Q.) Characteristics of laminar boundary layer along a thin flat plate
1Q.) Characteristics of turbulent boundary layer along a thin flat plate

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 16/12/21

Semester : I / II

Name of the Program: B.Tech ……II…… Year: …2016…….. Section: A

Course/Subject: … INTRODUCTION TO FLUID MECHANICS … … Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU … …..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……40…… Duration of Lesson: 1hr …

Lesson Title: … Approximate Solutions of Navier Stoke's Equations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Classify Approximate Solutions of Navier Stoke's Equations

2. Llist the Approximate Solutions of Navier Stoke's Equations

3. Discuss and solution of problems on Approximate Solutions of Navier Stoke's Equations

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Approximate Solutions of Navier Stoke's Equations various application

Assignment / Questions:. 1Q.) explain about Approximate Solutions of Navier Stoke's Equations various application

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 18/12/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: … INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……41…… Duration of Lesson: 1hr …

Lesson Title: … Laminar and turbulent Boundary layers(no deviations), problems

INSTRUCTIONAL/LESSON OBJECTIVES:

1 Examine, boundary layer thickness , momentum thickness
2. explain Boundary layer - concepts, displacement thickness
3. Compute problems on boundary layer along a thin flat plate problems

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Characteristics of laminar boundary layer along a thin flat plate
Boundary layer - concepts, displacement thickness
Characteristics of turbulent boundary layer along a thin flat plate
Characteristics of transition boundary layer along a thin flat plate
Characteristics of laminar sub layerboundary layer along a thin flat plate problems

Assignment / Questions:. 1Q.) Find momentum and displacement thickness for the following $\frac{u}{U} = 2\eta - 2\eta^3 + \eta^4$

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 22/12/21

Semester : I

Name of the Program : B.Tech II Year Section: A

Course/Subject: … INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……42…… Duration of Lesson: 1hr …

Lesson Title: … BL in transition and separation, control of BL, flow around submerged problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student able to

1. Discuss BL in transition and separation
2. Describe the control of BL
3. Compute Energy thickness Boundary layer
4. solve problems Computation on separation

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Boundary layer - concepts, momentum thickness, energy thickness BL in separation control of BL , flow around submerged shapes.

Assignment / Questions:. 1Q.) what is control of BL , BL in separation, BL in transition

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 16/12/21

Semester : I

Name of the Program : B.Tech II Year Section: A

Course/Subject: … INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……43…… Duration of Lesson: 1hr …

Lesson Title: … Drag and Lift forces- Magnus effect. Problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to

1. Analyse Drag and Lift forces
2. Distinguish the Drag and Lift forces- Magnus effect
3. Explain Drag and Lift forces- Magnus effect

4 Evaluate problems on Drag and Lift forces- Magnus effect

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Drag forces- stream line body, bluff body, skin friction
Lift forces- Magnus effect
Drag and Lift forces- Magnus effect

Assignment / Questions:. 1Q.) explain the drag forces of fluid past of cylinder
1Q.) explain the drag forces of fluid past of sphere

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 18/12/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……44…… Duration of Lesson: 1hr …

Lesson Title: … **laminar & turbulent flows:** reynold's experiment characteristics of laminar turbulent flows.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to

1. Identify laminar and turbulent flow
2. Analyse the laminar and turbulent flow experiment
3. Compare laminar and turbulent flow experiment
4. can compute problems on laminar and turbulent flow

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

laminar and turbulent flow experiment
laminar and turbulent flow theory
laminar and turbulent flow problems

Assignment / Questions:. 1Q.) explain Laminar and turbulent flow experiment?
1Q.) explain about laminar and turbulent flow

Objective Nos.: 1 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 22/12/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……45…… Duration of Lesson: 1hr …

Lesson Title: … Flow between Plates Flow through long tubes

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student will
1. Compare Flow between parallel plate Plates
2. Differentiate the Flow between one plate fixed and one plate move
3. Explain Flow through long tubes
4. solve problems Flow through long tubes

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Flow between parallel plate Plates pressure drop, shear stress, velocity distribution
Flow between one plate fixed and one plate move
Flow through long tubes pressure drop, shear stress, velcocity distribution

Assignment / Questions:. 1Q.) Derive expression of pressure drop Flow between parallel plate Plates
1Q.) Derive Flow through long tubes pressure drop, shear stress, velcocity distribution

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 23/12/12

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……46…… Duration of Lesson: 1hr …

Lesson Title: … flow through inclined tubes.Derivation and problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student will

1. Differentiate flow through different Horizontal tubes.
3. Explain flow through Horizontal tubes. Derivation
2. Solve problems on flow through inclined tubes.

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Flow through inclined long tubes pressure drop, shear stress, velocity distribution

Assignment / Questions:. 1Q.) Derive expression for Flow through inclined long tubes pressure drop, shear stress, velcocity distribution

Objective Nos.:4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 29/12/21
Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS . Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……47…… Duration of Lesson: 1hr …

Lesson Title: Problems on varius models

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to

1. Describe flow through inclined tubes.

2 . solve problems flow through inclined tubes

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Flow between parallel plate Plates pressure drop, shear stress, velocity distribution problems Flow between one plate fixed and one plate move problems Flow through long tubes pressure drop, shear stress, velcocity distribution problems

Assignment / Questions:. 1Q.) A smooth flat plate 1.5 m wide and 2.5 m long is towed length wise through still air with a velocity of 20 m/s.Assuming the boundary layer to be fully laminar, estimate its thickness at the trailing edge

Objective Nos.:4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 30/11/21

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……48…… Duration of Lesson: 1hr …

Lesson Title: … Problems on varius models

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. flow through inclined tubes. . problems
2. Differentiate the flow through inclined tubes. problems
3. explain flow through inclined tubes. . problems
4. problems flow through inclined tubes

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Flow through inclined long tubes pressure drop, shear stress, velocity distribution problems

Assignment / Questions:. 1Q.) A smooth flat plate 1m wide and 1.5 m long is towed length wise through still air with a velocity of 10 m/s. Assuming the boundary layer to be fully laminar, estimate its thickness at the trailing edge

2Q.) Air (Kinematic viscosity 0.15 X 10-4 m2/s) flows at 10 m/s past a smooth rectangular flat plate 30 cm wide and 3 m long.

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date:5/1/22
Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……49…… Duration of Lesson: 1hr …

Lesson Title: … Problems on various models
INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Elaborate Drag forces and lift forces with examples
2. compute the stream line body and problems

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Drag forces- stream line body, bluff body, skin friction problems Lift forces- Magnus effect problems Drag and Lift forces- Magnus effect problems

Assignment / Questions:. 1Q.) explain Drag forces- stream line body,
1Q.) explain bluff body, skin friction

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date:5/1/22
Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……50…… Duration of Lesson: 1hr …

Lesson Title: … Problems on various models

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to

1. Describe flow through inclined tubes. problems
2. Differentiate the flow through inclined tubes. Problems
3. knowledge of solving problems flow through inclined tubes

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Flow between parallel plate Plates pressure drop, shear stress, velocity distribution problems Flow between one plate fixed and one plate move problems Flow through long tubes pressure drop, shear stress, velocity distribution problems

Assignment / Questions:. 1Q.) Water of kinematic viscosity 0.016 stoke is conveyed through a 20cm diameter pipe at an average velocity of 2.2 m/s. The height of internal roughness projections is 1.5 mm. Assuming the pipe to be hydrodynamic cally rough, determine the friction factor and boundary shear stress.

2Q.) explain about Flow through inclined tubes pressure drop, shear stress, velocity distribution problems

Objective Nos.: 4 Outcome Nos4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date:6/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: S. VENKAT CHARYULU … ..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……51…… Duration of Lesson: 1hr

Lesson title: … closed conduit flow: laws of fluid friction - Darcy's equation, Minor losses

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be

1 closed conduit flow: laws of fluid friction
2. Able to explain the closed conduit flow: Darcy's equat
3. Ability to explain closed conduit flow: laws of fluid friction
4. knowledge of solving problems Minor losses

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

closed conduit flow: laws of fluid friction, Darcy's equation, Minor losses_ major loss de friction, minor losses due pipe fittings, sudden contraction, sudden enlargement, due to bends, due to type of fittings

Assignment / Questions:. 1Q.) explain what I s major loss and mionr losses ,
1Q.) Derive expression for the sudden enlargement

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 8/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……52…… … Duration of Lesson: 1hr

Lesson Title: … pipes in series - pipes in parallel Pipe network problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Identify connected pipes in series
2. Compute the connected pipes in parallel
3. Explain Pipe network problems
4. Knowledge of solving problems on pipes in series - pipes in parallel

TEACHING AIDS : White Board /Marker
TEACHING POINTS :

Concept pipes in series - pipes in parallel -Pipe network

Assignment / Questions:. 1Q.) what is pipe networking?
1Q.) explain different methods of pipe networking

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 12/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU … ..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……53…… Duration of Lesson: 1hr …

Lesson Title: … Total energy line and hydraulic gradient line

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Differentiate Total energy line in pipe flow
2. Explain hydraulic gradient line
3. solve problems on Total energy line and hydraulic gradient line

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Total energy line and hydraulic gradient line in pipe flow. drawing the HGL and TEL lines

Assignment / Questions:. 1Q.) explain total energy line and hydraulic energy line,
2Q.) explain bluff body, skin friction

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 13/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……54…… Duration of Lesson: 1hr …

Lesson Title: … variation of friction factor with Reynold's number - Moody's Chart.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to

1. Define friction factor with Reynolds number
2. compare variation of friction factor with Reynold's number
3. Explain moody chart
4 solve problems on friction factor with Reynolds number

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

friction factor with Reynolds number moody chart rough pipes , smooth pipes
friction factor with Reynolds number moody chart rough pipes , rough pipes
friction factor with Reynolds number moody chart rough pipes commercials pipes

Assignment / Questions:. 1Q.) explain Drag forces- stream line body,
1Q.) explain bluff body, skin friction

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

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TUTOTIAL SHEET - 4

Academic **Y**ear : 2021-22 Date: 13/1/22
Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A

Course/Subject: ……FLUID MECHANICS……..

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.
This Assignment corresponds to Unit No. 4

Q1. A thin plate is moving in still atmosphere air at a velocity of 5m/s. the length of plate is 0.6m and wi dth 0.5m. calculate the thick ness of boundary layer at the end of the plate and drag force at the oneside of the plate take density of air as 1.24kg/m3 and kinematic viscosity as o.15 stokes
Q2 A rough pipe is of diameter 8cm .The velocity at a point is 3cm from wall is 30% more than the velocity at a point 1cm from pipe wall. Determine the average height of the roughness
Q3 derive the expression for the velocity distribution for laminar flow through the pipe.

Q4 write characteristics of turbulent flow with clear explanation of prandtls contribution

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

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ASSIGNMENT SHEET -4

Academic **Y**ear : 2021-22 Date:… 13/1/22
Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A

Course/Subject: ……FLUID MECHANICS……

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No. / Lesson …IV

1. Q1. What is boundary layer discuss about the prandle contribution
Q2 How the navier stokes equation influence in the fluid flow.? Discuss.
Q3.Air flows 10m/s past a smooth rectangle flat plate 0.0.8m wide and 1.2 m long. Assume that the turbulent level in th on coming stream is low and that transition occurs at $Re=2x10^5$ calculate length of boundary layer form leading edge. Find thickness of boundary layer assume Blasius velocity profile.

Q4. A plate of 600mm length and 400mm wide is mimmersed in afluid of sp.gr.and kinematic viscosity is 10 -4 m2/s .the fluid is moving with a velocity of 6m/s. Determine i)Boundary layer thickness ii)shearstress at the end of the plate iii) drag force on one side of the plate.

Objective Nos.: 4 Outcome Nos.: 4 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 15/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……55…… Duration of Lesson: 1hr …

Lesson Title: … **measurement of flow:** pitot tube, venturi meter

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. Measurement of flow using the pitot tube, venturi meter
2. Draw **and explain** pitot tube, venturi meter
4. solving problems on measurement of flow: pitot tube various cases

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

d

Assignment / Questions:. 1Q.) explain different types of discharge measurements
1Q.) explain about the

Objective Nos.: 1 Outcome Nos.: 1 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 19/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……56…… Duration of Lesson: 1hr …

Lesson Title: measurement of flow: pitotube, venturimeter

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be
1. How do you measure the flow using the pitotube, venturi meter
2. Compare measurement of flow**:** pitotube, venturimeter
4. solving problems on measurement of flow: pitotube, venturimeter

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Measurement of flow using the pitotube pitotube, measurement of flow , venturimter etc

Assignment / Questions:. 1Q.) Explain pitotube,
1Q.) explain measurement of flow using the venturimeter,

Objective Nos.: 5 Outcome Nos.: 5 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 20/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……57…… Duration of Lesson: 1hr …

Lesson Title: … orifice meter - classification of orifices, flow over rectangular, triangular notch

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. categorise the need of orifice meter and venturimeter
2. understand the classification of orifices

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

orifice meter - classification of orifices, flow over rectangular, triangular

Assignment / Questions:. 1Q.) explain Drag forces- stream line body,

1Q.) A rough pipe of diameter 0.1m carries water at 200C at the rate of 55 lit/s. If the average height of projections on the pipe surface is 0.15mm, calculate the friction factor, maximum velocity, shear stress at the pipe surface and the shear velocity.

Objective Nos.: 5 Outcome Nos.: 5 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 20/1/22
Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……58…… Duration of Lesson: 1hr …

Lesson Title: … orifice meter - classification of orifices, flow over rectangular, triangular notch

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be:

1. identify … orifice meter
2. understand the classification of orifices
3. explain flow over rectangular
4. e of solving problems on

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

orifice meter - classification of orifices, flow over rectangular, triangular

Assignment / Questions:. 1Q.) explain Drag forces- stream line body,
1Q.) A rough pipe of diameter 0.1m carries water at 200C at the rate of 55 lit/s. If the average height of projections on the pipe surface is 0.15mm, calculate the friction factor, maximum velocity, shear stress at the pipe surface and the shear velocity.

Objective Nos.: 5 Outcome Nos.: 5 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 26/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……59…… Duration of Lesson: 1hr …

Lesson Title: … trapezoidal and Stepped notches -Broad crested weirs.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be
1 . , Discriminate trapezoidal and Stepped notches -Broad crested weirs.
2 Illustrate lustrate Stepped notches and weirs
3. explain Broad crested weirs with neat sketch
4. solving problems on trapezoidal and Stepped notches -Broad crested weirs.

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Theory of trapezoidal and Stepped notches -Broad crested weirs. Derivation trapezoidal and Stepped notches -Broad crested weirs Concept trapezoidal and Stepped notches -Broad crested weirs

Assignment / Questions:. 1Q.) Derive an expression for trepizoidal notch,
2Q.) Derive an expression for rectangular notch

Objective Nos.: 5 Outcome Nos.: 5 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 27/01/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: INTRODUCTION TO FLUID MECHANICS … Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……60…… Duration of Lesson: 1hr …

Lesson Title: … Problems on varius models

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be

1. Deduce Pitot tube, Venturi meter expression in model problems
2. solving problems on Pitot tube, Venturimeter covering inclined and horizontal case

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

Pitot tube, theory
Venturi meter theory horizontal and inclined
Derivation Pitot tube
Derivation Venturi meter

Assignment / Questions:. 1Q.) Water discharge at the rate of 98.2 lit/sec through a 120mm diameter, vertical shape –edged orifice placed under a constant head of 10m. A point on the jet, measured from the vena-contracta of the jet has coordinates 4.5m horizontal and 0.54m vertical. Find the positions C_c ,C_d C_v of the orifice? ,

1Q.) derive pitot tube expression

Objective Nos.: 5 Outcome Nos.: 5 Signature of faculty

LESSON PLAN

Academic **Y**ear : 2021-22 Date: 02/1/22

Semester : I

Name of the Program: B.Tech II Year Section: A

Course/Subject: … INTRODUCTION TO FLUID MECHANICS Course Code: GR20A2012……

Name of the Faculty: … S.VENKAT CHARYULU ……..Dept.: CIVIL ENGINEERING

Designation: ASSISTANT PROFESSOR

Lesson No: ……61…… Duration of Lesson: 1hr …

Lesson Title: … pipes in series - Problem

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be

1. Differentiate, pipes in series - with common pipes
2. The pipes in series - Model Problem
3. solving problems on pipes in series -parallel Problem

TEACHING AIDS : White Board /Marker

TEACHING POINTS :

pipes in series - Explanation and Problem pipes in parallel- Problem with sketches pipes in networking - Problem and applications

Assignment / Questions:. 1Qwhat is water distribution system how they design ?
2Q.) 1Qwhat is water distribution in parallel system how they design?

Objective Nos.: 5 Outcome Nos.: 5 Signature of faculty

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ASSIGNMENT SHEET - 5

Academic **Y**ear : 2021-22 Date: 02/1/22

Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A/B

Course/Subject: ……FLUID MECHANICS……

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No. / Lesson …UNIT-V…….

Q1. Classify types of notchs and weirs. And obtain the expression for the rectangular notch.

Q2 what is triangular notch ? derive expression for the triangular notch

Q3 water flows ove rectangular weir 1m wide at the depth of 150mm and passthrough a triangular weir.Taking cd for the rectangle and triangle weir as 0.62 and 059 respectivly find the depth over triangular weir.

Q4.find the discharge through a trapezoidal notch which is 1m wide at the top 0.4m at the bottom and is 30cm height . the head over notch is 20cm .take cd=0.62 for rectangle and cd=0.6 for triangle portions.

Objective Nos.: 5

Outcome Nos.: 5 and 5

Signature of HOD Signature of faculty

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TUTOTIAL SHEET - 5

Academic **Y**ear : 2021-22 Date: 02/1/22

Semester : I

Name of the Program: B.Tech …II……Year: …2021-22……..Section: A/B

Course/Subject: ……FLUID MECHANICS……..

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

This Assignment corresponds to Unit No. 5

Q1. A horizontal venturimeter with inlet diameter 20cm and throat diameter 10cm is used to measure the flow of water. The pressure at inlet is 17.658n/cm2 and the vacuum pressure at the throat is 30cm of mercury. find the discharge of water through venturimeter. take Cd=0.98
Q2 Hydraulic gradient line and Total energy line ii) pipes connected in series and parallel
Q3 Darcy weisch bach equation.
Q4 A 135˚ reducing bend is connected in a pipe line, the diameter at the inlet and outlet of the bend being 600mm and 600mm respectively , find the force exerted by water on bend if internal pressure at inlet to bend is 18.829N/cm2 and rate of flow of water is 1200 lit/sec.

Objective Nos.: 5

Outcome Nos.: 5 and 5 Signature of faculty

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EVALUATION STRATEGY

Academic **Y**ear : 2020-21

Semester : I

Name of the Program: B.Tech ……II…… Year: …2021-22…….. Section: A/B

Course/Subject: …… FLUID MECHANICS… …….. Course Code: GR20A2012

Name of the Faculty: … S.VENKAT CHARYULU……..Dept.: CIVIL ENGINEERING

Designation: ASST.PROFESSOR

1. **TARGET** **:** 85 % Result

A) Percentage for pass: 85 %

b) Percentage of class: I class with distinction 50%, I class 20%, pass class15 %

2**. COURSE PLAN& CONTENT DELIVERY**

Course plan is designed in units and lesson wise . each unit is divided in to no of lessons . each lesson has covered as one hour lecture. Lecture classes are covered very effectively with concept of content is correlated to practical

Practices. Various models of numerical problems covered in each concept at define, apply, analyze level to meet the course objectives and to achieve the course out comes. Each unit is given one Tutorial problems which covers the understand and analyze level. Related program, course concept is covered in lab experiments. Different models are demonstrated such as weirs, notchs, spillways, channels, pipe flows ,venturimeter, orifice meter, Bernoullis theorem verification ,mouthpiece and orifice and Reynolds number verification.

3. METHOD OF EVALUATION

3.1 Continuous Assessment Examinations (CAE-I, CAE-II): continuation of assessment is doing with Conducting quiz, assignment, tutorials in each unit and for every 50% of course coverage by conducting the (mid exams) CAE-I and CAE-II. Assessment is also done based on attending of lessons. final assessment has done with external exams.

3.2 Assignments/Seminars :Assignments and tutorial Sheets given for Each unit .

3.3 Mini Projects: -

3.4 Quiz: is conducted for each unit topic wise

3.5 Semester/End Examination :End exam preparation with the model question paper (previous qp)

3.6 Others: power point presentation

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subjects in this Semester.

Power point presentation of different units.

Signature of faculty

Date:

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Mappings of CO's, COB's Vs PO's, POB's

P-Outcomes → / Course -Outcomes ↓	A	B	C	D	E	F	G	H	I	J	K	L	PSO 1	PSO 2
1. Comprehend the various fluid properties and fluid statics .	M		H	M			M			M		M	H	M
2. Understand the broad principles of hydrostatic forces on submerged planes		M		M			M			M		M	M	M
3. Analyzing fluid dynamics and kinematics.	M	M	M	H			M			M		M	M	H
4. classify concept of boundary layer and predict the laminar and turbulent flows	M	M	H	M			M			M		M	M	M
5. Predict the losses in pipes flows and able to calculate discharge measurement.	M	M	H	M			M			M		M	M	M

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MAPPING

GR20A2012 Int. Fluid Mechanics	**Course Outcomes**				
Course Objectives	1	2	3	4	5
1	X				
2		X			
3			X		
4				X	
5					X

Assessments

1. Assignment 2. Internal Examination 3. External Examination

4. Practical Projects 5. Viva

GR20A2012			**Course Outcomes**		
Assessme	1	2	3	4	5
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4	X	X	X	X	X
5	X	X	X	X	X

GR20A2012			**Course Objectives**		
Assessme	1	2	3	4	5
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4	X	X	X	X	X
5	X	X	X	X	X
5				X	

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II B.Tech I Semester Mid- I Examinations

INTRODUCTION TO FLUID MECHANICS

(Civil Engineering)

Time: 90 Minutes **Max Marks: 20**

(Answer ALL questions. All questions carry equal marks)

Time: 75 Minutes **3 * 5 = 15 Marks**

1	(a) Establish an Expression for Hydrostatic Law (b) A Differential manometer contain fluids of sp.gr 0.95 and 0.85 in pipe A and B at the same level. If the level of mercury in left limb and right limb is at 25cm and 45 cm from the center of Center Of pipe restively. find the differential pressure if the A and B are at the same level.	**[5]**	**CO1**	**BL2**
	OR			
2	(a) what is Newton Law of viscosity Explain with neat skecth (b) If the velocity of profile of a fluid over a plate is parabolic with the vertex of 20 cm from the plate,where the velocity is 120 cm/sec .calculate the velocity of gradients and sheer stress at a distance of 0,10 and 20 cm from the plate ,if the viscosity of the fluid is 8.5poise.	**[5]**	**CO1**	**BL2**
3	(a) Discuss the Veritcal submerged plane with derivation. b) what is total pressure and center of pressure	**[5]**	**CO2**	**BL3**
	OR			
4	(a) Discuss the Inclined submerged plane with derivation. (b) Determine the total pressure on circular plate of diameter 1.5 m which is placed vertically in water in such away that a centre of the plate is 3m below the free surface of water. Find the centre of pressure also.	**[5]**	**CO2**	**BL3**
5	(a)Explain the different types of Flows (b) Explain the Metacentric heght and Metacenter	**[5]**	**CO3**	**BL3**
	OR			
6	(a) what is different types Fluids with neat skech (b) Explain the concept of surface tension and capilarity	**[5]**	**CO1**	**BL2**

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II B.Tech I Semester Mid- I Examinations

INTRODUCTION TO FLUID MECHANICS

OBJECTIVE

Multiple Choice Questions (MCQs)

(Answer ALL questions. All questions carry equal marks)

Time: 15 Minutes **10 * $^1/_2$ = 5 Marks**

1	Relation between the atmospheric pressure(A) gauge pressure (G)and absolute pressure(AB) a) A= G-AB b) A= G+AB c) A= G /AB d) A= G - AB –G/AB	**[ ]**
2	Dimension of kinematic viscosity is given by a)MLT^{-2} b)M^2LT^2 c)none d)All	**[ ]**
3	Poise is unit of a) Mass density b) viscosity c) kinematic viscosity d) velocity gradient	**[ ]**
4	For the soap bubble surface tension and pressure difference are related as a) $\Delta P = \sigma/4\ d$ b) $\Delta P = \sigma/2\ d$ c) $\Delta P = 4\sigma/d$ d)$\Delta P = 8\sigma/d$	**[ ]**
5	The M.I of triangle from the its base if h is height and b is base of triangle a) $bh^3/12$ b) $hb^3/24$ c) $bh^3/36$ d) none	**[ ]**
6	Steady flow the lines and steady uniform flows a) Similar b) orthogonal c) parallel d) orthogonal intersected	**[ ]**
7	Buoyancy force is related to weight of body in the fluid is equal to a) Displacement of fluid b) velocity of fluid c) displacement d) acceleration	**[ ]**
8	Steady flow is properties of fluid w. r . t to a) Distance b) velocity c)time d) none	**[ ]**
9	Condition for the possible case of fluid flow for two dimensional flows is a)Velocity in one direction only b) Velocity in two direction only c) Velocity in three direction only d) Velocity in four direction only	**[ ]**
10	Continuity equation is based on the principle of conservation of a) Energy b) Mass c) Momentum d) all	**[ ]**

*****

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INTRODUCTION TO FLUID MECHANICS **Subject Code: GR20A2010**

II B.Tech I Sem **II MID** **Descriptive Exam** **Date: 30-1-2021**

Time Duration: 30 min **Max Marks: 10**

Answer any two questions. Each question carries 5 marksa

1) Derive the energy equation and discuss the surface body forces (5M) (Co3)

2 a) Explain laminar and turbulent boundary layer concept

b) Three different types of diameters of pipes are in series which are connected two reservoirs A and B the length of pipes are 300m,170m, and 210m Respectively with diameters of 300mm,200mm and 400mm

respectively if the total head is 12m and f1=.2=005,f2=.0051 and f3=400mm find all i) minor losses ii) all

major losses . Take v1=1.407m/s , v2 is 2 times v1 and v3 is 0.5 time v1 (2.5+2.5M) (Co 4)

3a) Derive the Darcy WeischBatch equation (2.5+2.5M) (Co 5)

b) Write short note on pitot tube , stepped notch

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INTRODUCTION TO FLUID MECHANICS **Subject Code: GR20A2010**

II B.Tech II I Sem **II MID QUIZ Exam** **Date: 30-1-2021**

Time Duration: 10 **Max Marks: 10**

Rollnumber

***Time* Duration:10min** **Marks: 10x1 =10**

Answer all questions. Each question carries equal marks

1 In pipe bend the total force is equal to ( )

a) Change in velocity b) change in momentum c) change in acceleration d) none

2. Euler equation contain ( )

a) Gravity forces b) pressure forces c) elastic forces d) a and b

3. If the weir is said to be broad crested when length and Head relationship are ( )

a) 2L>H b) 2L=3H c) 2L,<H d) ALL

4. The ratio of max velocity to the average velocity of flow in long tube is ( )

a) Vmax= 2/3 Average velocity b) Vmax =1 c) Vmax= v mean d) V max> Vmean

5. The discharge expression for the trapezoidal notch is ( )

a) combine rectangle and two triangle b) combine rectangle and 1 triangle c) combine 2 Rectangle and 2 Triangle

6. Energy equation is given as ( )

a) Pressure head b) velocity head c) Datum head d) none

7. Laminar Boundary layer thickness is given by notation ( )

a) δ^1 b) δ^* c) δ^{**} d) δ

8. Displacement thick ness and Energy thickness is given as ( )

a) δ^1 δ^* b) δ^* δ^{**} c) δ^{**} δ^* d) δ δ^*

9. The range of Laminar boundary is ( )

a) $1x10^5$ b) $1x10^6$ c) $1x10^7$ d) $1x10^8$

10. The Total Energy line and Hydraulic Gradient line and center line of pipe are ( )

a) Intersect each other b) parallel to each other c) both d) none

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MID-1 MARKS

Roll.No	Q.No 1	Q.No 2	Q.No 3	Q.No 4	Q.No 4
1	CO1(5M)	CO1(5M)	CO2(5M)	CO2(2.5M)	CO3(2.5M)
2	2.5	1.5	1.5	2.5	1.5
3	2.5	3	1.5	2.5	2.5
4	1	1	1.5		
5	2.5				
6	4.5				
7	2.5		1		
8	1.5	2.5	1	1.5	
9	4	4	3.5		
10		2.5		1	1
11	4.5	3	4.5		
12	4.5	3	1.5	2	
13	2	5		2	2.5
14	0.5	1		2.5	2.5
15	3.5	4.5		1.5	1.5
16		4	5	1.5	
17	2.5	2.5	2.5		
18	4.5	3.5	2.5		
19	2.5		4	1	
20	2.5			2	1
21	2.5	3	5	1.5	2.5
22	2	0.5	1		
23	2.5			2	
24	2.5				
25	1.5	1.5	1.5		
26	1.5	1	1		
27	5	1	3		
28	3.5	3.5		1.5	2.5
29	2.5	4.5	4.5		
30	2.5	1			
31	4.5	5	2.5		
32	4.5	4.5	3.5		
33		4.5	1.5	2.5	1.5
34	2.5	1.5	1.5		

35	5	5	5	1.5	2
36	3.5	2	2		
37	5	4.5	2	1.5	2.5
38	4.5	3.5	3		
39	5	4		1	
40		3.5	3.5	2.5	
41	2.5	2	2		
42	2.5	5	4.5		
43	5	5	3		
44	3.5	5	2.5		2.5
45	0.5		2		
46		1.5	3.5		
47	3.5	1	1		1.5
48	2.5	1			
49			2.5	2.5	
50	5	4.5	4.5		
51				1.5	1.5
52					
53					
54	4.5	4.5	4.5		
55	3.5	5		2.5	2.5
56	2.5				
57	2.5		4.5	2.5	2.5
58	4.5	5	5		
59		5	2.5	3.5	
60	5	2.5	2		
61		5	4.5	1.5	2.5
62	5	4.5	4		
63	5	2.5			2.5
64	5	5	5		

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MID- II MARKS

S.No	Roll No	Q.No 1	Q.No 2	Q.No 3	Q.No 4	Q.No 4
S.No	Roll No	CO3(5M)	CO4(5M)	CO4(5M)	CO5(2.5M)	CO5(2.5M)
1	20241A0101	2.5			1	
2	20241A0102		2.5	2	2	
3	20241A0103	3			2	2.5
4	20241A0104	5	5		1.5	2.5
5	20241A0105	4	5	4.5	1	1
6	20241A0106	2.5	2.5		1.5	1.5
7	20241A0107	5	4	4	1	1
8	20241A0108	5	5	2.5	2.5	2.5
9	20241A0109	2.5			1	2
10	20241A0110	2		0.5		
11	20241A0111		4	4	4	
12	20241A0112	2	1.5			
13	20241A0113	4		4.5	2.5	
14	20241A0114	2.5		3.5	1.5	1.5
15	20241A0115			3.5	1	1.5
16	20241A0116	2.5		5	1.5	2.5
17	20241A0117		5	4	1.5	1.5
18	20241A0118	2.5		1	0.5	
19	20241A0119	4.5		2.5	2.5	
20	20241A0120	0.5		2.5		
21	20241A0121	1			2.5	2.5
22	20241A0122	5	2.5	5		
23	20241A0123	4.5	3			
24	20241A0124	2.5	4.5	4.5	4	
25	20241A0125	5	4	2.5		
26	20241A0126			1.5	1	1
27	20241A0127	4.5		4.5	1.5	2.5
28	20241A0128	2.5		0.5		2.5

29	20241A0129	**2.5**		**1.5**		**2.5**
30	20241A0130	**4.5**	**5**	**4**	**2**	**2.5**
31	20241A0131	**5**	**4.5**		**2.5**	
32	20241A0132	**1.5**	**1**			
33	20241A0133					
34	20241A0134	**4.5**		**1.5**	**2**	**2**
35	20241A0135	**4**		**5**	**2.5**	**2**
36	20241A0136	**2.5**	**2.5**			
37	20241A0137	**4.5**	**4**		**2.5**	**2.5**
38	20241A0138	**5**	**5**	**4.5**	**2**	
39	20241A0139	**5**	**5**	**5**		
40	20241A0140	**4.5**	**5**	**3**		
41	20241A0141	**4**		**5**		**2**
42	20241A0142	**1.5**		**2.5**		
43	20241A0143	**1.5**		**1.5**		
44	20241A0144	**2.5**	**3**			
45	20241A0146	**2.5**			**2.5**	**1.5**
46	20241A0147	**2.5**	**1**	**2**	**1.5**	
47	20241A0148	**4.5**		**4.5**	**1.5**	
48	20241A0149	**4.5**		**4.5**	**1**	**2**
49	20241A0150	**2.5**	**5**	**0.5**		
50	20241A0151	**2.5**	**4.5**	**1.5**		
51	20241A0152	**4**	**1.5**	**1**		
52	20241A0153	**2.5**	**4**	**1.5**		
53	20241A0154	**4.5**		**2.5**		
54	20241A0155		**5**	**5**	**1**	**2.5**
55	20241A0156			**3**	**2.5**	**1.5**
56	20241A0157	**4.5**	**4.5**	**5**		
57	20241A0158	**5**	**5**			**2.5**
58	20241A0159		**5**	**4.5**	**5**	
59	20241A0160	**4**	**3.5**		**1.5**	**2.5**
60	21245A0101	**4.5**	**5**		**2.5**	**2.5**
61	21245A0102	**3.5**	**4.5**		**1.5**	**2.5**
62	21245A0103	**3.5**		**1.5**	**2.5**	**2.5**
63	21245A0104	**5**		**2.5**	**2.5**	**2.5**
64	21245A0105	**4.5**		**1.5**	**2.5**	**2.5**

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090, (040) 6686 4440

RUBRIC FLUID MECHANICS

Academic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech ……II…… Year: ……2021-22. Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: …GR20A2012

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

Objective: To learn Theory and practical aspect of Fluid Mechanics

Student outcome : Learn application of different INTRODUCTION TO FLUID MECHANICS concepts and hands on Experience of

Irrigation and Hydraulic fields

RUBRIC TEMPLATE FLUID MECHANICS

			Beginning	**Developing**	**Reflecting Development**	**Accomplished**	**Exemplary**	**Score**
S.No	**Name of the student**	**Performance Criteria**	**1**	**2**	**3**	**4**	**5**	
1	21245A0101	The level of knowledge on understand various	Low level knowledge on understand various	Able to understand various concepts of	Ability to explain various concepts of	Full knowledge various concepts of	Thoroughly analysing & applying various	**5**
		Ability to calculate the various problems of	Low level knowledge on to calculate the various	Able to understand to calculate the various	Ability to explain And calculate the various	Full knowledge to calculate the various	Thoroughly analysing & applying to calculate the	**5**
		Ability to calculate the various problems of	Low level knowledge on to calculate the various	Able to understand to calculate the various	Ability to explain to calculate the various	Full knowledge to calculate the various problems of	Thoroughly analysing & applying to calculate the	**5**
		The level of knowledge on fluid mechanics	level knowledge on fluid mechanics	Able to understand fluid mechanics	Ability to explain fluid mechanics concepts by	Full knowledge fluid mechanics	Thoroughly analysing & applying fluid mechanics	**5**
						Average		**5**

RUBRIC TEMPLATE FLUID MECHANICS

			Beginning	**Developing**	**Reflecting Development**	**Accomplished**	**Exemplary**	**Score**
S.No	**Name of the student**	**Performance Criteria**	**1**	**2**	**3**	**4**	**5**	
2	21245A0101	The level of knowledge on understand various	Low level knowledge on understand various	Able to understand various concepts of	Ability to explain various concepts of	Full knowledge various concepts of	Thoroughly analysing & applying various	**5**
		Ability to calculate the various problems of	Low level knowledge on to calculate the various	Able to understand to calculate the various	Ability to explain And calculate the various	Full knowledge to calculate the various	Thoroughly analysing & applying to calculate the	**4**
		Ability to calculate the various problems of	Low level knowledge on to calculate the various	Able to understand to calculate the various	Ability to explain to calculate the various	Full knowledge to calculate the various problems of	Thoroughly analysing & applying to calculate the	**5**
		The level of knowledge on fluid mechanics	Low level knowledge on fluid mechanics	Able to understand fluid mechanics	Ability to explain fluid mechanics concepts by	Full knowledge fluid mechanics	Thoroughly analysing & applying fluid mechanics	**5**
						Average		**5**

RUBRIC TEMPLATE FLUID MECHANICS

Rol.No	Name of the student	Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
2124A0103		**1**	**2**	**3**	**4**	**5**	
	The level of knowledge on understand various	Low level knowledge on understand various	Able to understand various concepts of	Ability to explain various concepts of Fluid statics	Full knowledge various concepts of Fluid statics	Thoroughly analysing & applying various	**4**
	Ability to calculate the various problems of	Low level knowledge on to calculate the various	Able to understand to calculate the various	Ability to explain And calculate the various	Full knowledge to calculate the various problems of	Thoroughly analysing & applying to calculate the	**4**
	Ability to calculate the various problems of	Low level knowledge on to calculate the various	Able to understand to calculate the various	Ability to explain to calculate the various	Full knowledge to calculate the various problems of	Thoroughly analysing & applying to calculate the	**5**
	The level of knowledge on fluid mechanics	Low level knowledge on fluid mechanics	Able to understand fluid mechanics	Ability to explain fluid mechanics concepts by	Full knowledge fluid mechanics concepts by	Thoroughly analysing & applying fluid mechanics	**4**
					Average		**4**

			Beginning	**Developing**	**Reflecting Development**	**Accomplished**	**Exemplary**	**Score**
S.No	**Name of the student**	**Performance Criteria**	**1**	**2**	**3**	**4**	**5**	
4	2124A0104	The level of knowledge on understand various concepts of Fluid statics	Low level knowledge on understand various concepts of Fluid statics	Able to understand various concepts of Fluid statics properties,	Ability to explain various concepts of Fluid statics properties, mechanics and	Full knowledge various concepts of Fluid statics properties,	Thoroughly analysing & applying various concepts of Fluid statics	**4**
		Ability to calculate the various problems of fluid pressures fluid at static,	Low level knowledge on to calculate the various problems of fluid pressures	Able to understand to calculate the various problems of fluid pressures	Ability to explain And calculate the various problems of fluid pressures	Full knowledge to calculate the various problems of fluid pressures	Thoroughly analysing & applying to calculate the various problems of	**3**
		Ability to calculate the various problems of boundary layer, Drag and lift	Low level knowledge on to calculate the various problems of boundary layer,	Able to understand to calculate the various problems of boundary layer,	Ability to explain to calculate the various problems of boundary layer,	Full knowledge to calculate the various problems of boundary layer, Drag and lift	Thoroughly analysing & applying to calculate the various problems of	**3**
		The level of knowledge on fluid mechanics concepts by application of	Low level knowledge on fluid mechanics concepts by application of	Able to understand fluid mechanics concepts by application of	Ability to explain fluid mechanics concepts by application of designing pipe	Full knowledge fluid mechanics concepts by application of	Thoroughly analysing & applying fluid mechanics concepts by application of	**4**
						Average		**4**

(

COURSE COMPLETION STATUS

Academic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech ……II…… Year: ……2021-22. Section: A

Course/Subject: …… INTRODUCTION TO FLUID MECHANICS …… Course Code: …GR20A2012

Name of the Faculty: ……S.VENKAT CHARYULU ……..Dept.:…CIVIL ENGINEERING

Designation : ASSISTANT PROFESSOR.

Objective: To learn Theory and practical aspect of Fluid Mechanics

Units	**Remarks**	**Objectives Achieved**	**Outcomes Achieved**
Unit I	20/10/21 Unit covered on time	1	1
Unit II	30/10/21Unit covered on time	2	2
Unit III	30/12/21Unit covered on time	3	3
Unit IV	19/1/22 Unit covered on time	4	4
Unit V	29/1/22 Unit covered on time	5	5

Signature of HOD Signature of faculty
Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

A-Srikar Rao 20241A0101

Gokaraju Rangaraju Institute of Engineering & Technology
(Autonomous College Affiliated to JNTUH) (12 Pages)
Bachupally, Kukatpally, Hyderabad - 500090

I II MID TERM EXAMINATION

No. 393539

H.T. No. 2 0 2 4 1 A 0 1 0 1

Name of the Examination Introduction to Fluid Mechanics

Course B-Tech (2-I) Branch Civil Date 06/12/21.

Signature of the Invigilator

Q.NO.	1		2		3		4		5		6		TOTAL
	a	b	a	b	a	b	a	b	a	b	a	b	
MARKS	2	1½			1	2			-				6½

START WRITING FROM HERE

Hydrostatic Law: The law which states the Hydrostatic friction b/w the two fluids.
-> It is useful in relation b/w fluids.

Manometer: It is measuring instrument which is used in Measuring of pressure of fluid.
-> They are of two types
(i) Simple Manometer (ii) differential Manometer.
-> differential Manometer is used by using two types fluid (i) heavy fluid (ii) Measuring fluid

→ It have one end attached to pointa and another end is to atmosphere

6(b) Surface tension:
A: → It is one of the fluid property. ... the tensile force

Gokaraju Rangaraju Institute of Engineering & Technology

(Autonomous College Affiliated to JNTUH)

Bachupally, Kukatpally, Hyderabad - 500090

(12 Pages)

I	II	MID TERM EXAMINATION

333576

H.T. No.	2	0	2	4	1	A	0	1	3	8

Name of the Examination: Ist - MID TERM EXAMINATION

Course: Fluid Mechanics Branch: Civil - A Date: 06-12-21

Signature of the Invigilator

Q.NO.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	TOTAL
MARKS	1				1								2

START WRITING FROM HERE

...ablish an expression for Hydrostatic
... A Differential manometer contain
...ds of sp.gr 0.95 and 0.85 in pipe
...and B at the same level. If the
...el of mercury in left limb and
...ht limb is at 25cm and 45cm from
... center of centr of pipe restively.
... the differential pressure if the
... and B are at the same level.
...Netwon law of viscosity with
... the velocity of profile

shear stress at a distance of 0,10
20 cm from the plate, if the
...ity of the fluid is 8.5 poise

...cuss the vertical submerged plane
...h derivation. what is total pressure
... center of pressure. Discuss the
...clined submerged plane with derivation.
...ermine the total pressure on
...cular plate of diameter 1.5m which
... placed vertically in water in
...ch away that a center of the
...ate is 3m below the free
...rface of water. Find the centre
...of Pressure lab. Explain the different
...pes of flows. Explain the
...etacentric height and Metacenter
...hat is different types of fluids
...with neat skech. Explain the
...oncept of surface tension and
capillarity

3) If the velocity of profile of a fluid over a plate is parabolic with the vertex of 20cm from the plate, where the velocity is 120 cm/sec calcula the velocity of gradients and sheer stress at a distance of 0,10 and 20 cm from the plate, if the viscosity of the fluid is 8.5 poise. A Differentia Manometer contain fluids of sp.gr 0.95 and 0.85 in pipe A and B at the same level. If the level of mercury in left limb and right limb is at 25cm and 45cm.

Examination II Year ISem Mid 1 Examinations

IFM Branch CIVIL Date 06-12-2021

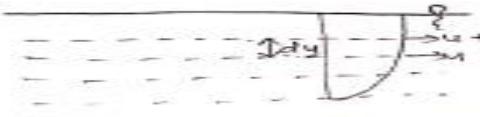
M. Sowjanya
Signature of the Invigilator

Q.NO.	1		2		3		4		5		6		TOTAL
	a	b	a	b	a	b	a	b	a	b	a	b	
MARKS	-		2½	2½	2½	2½			2½	2½			10

START WRITING FROM HERE

Newton law of Viscosity.

Consider a fluid flow which the velocity at layer of a fluid is u.



id the velocity at adjacent top layer is u+d
/elocity distribution is a parabolic variatio
he two layers are separated by a distan
then shear stress is directly proportion
the velocity gradient / shearstrain / rate o
strain.

$\tau = \mu \frac{du}{dy}$

μ = Coefficient of Viscosity

$\frac{du}{dy}$ = Velocity gradient / shear strain / rate of shearstrain.

: law of Viscosity: It states that the stress in a fluid flow is directly onal to its velocity gradient.

:0cm/sec @ a distance
m $\mu = 8.5$ poise
$= 8.5 \times 0.1$
$= 0.85 \frac{N\text{-}S}{m^2}$ $\left[\because 1 \text{poise} = 0.1 \frac{N\text{-}S}{m^2}\right]$

Consider, $u = Ay^2 + By + c$

$u = 0 \Rightarrow 0 = A(0) + B(0) + C \Rightarrow \boxed{C = 0}$

$40A + B = 0 \Rightarrow A = \frac{-B}{40} \rightarrow (2)$

(2) in (1) $\Rightarrow u = 10\left(\frac{-B}{40}\right) + 20B = 120$

$10b = 120$

$\boxed{B = 12}$

Substitute 'B' in (2) $\Rightarrow A = \frac{-12}{40} \times 10 = -0.3$

$\boxed{A = -0.3}$

Substitute A, B & C in eq. $u = Ay^2 + By + C$

$u = -0.3y^2 + 12y$

$\frac{du}{dy} = -0.6y + 12$

@ 0cm $\Rightarrow \frac{du}{dy} = -0.6(0) + 12 = 12\ s^{-1}$

@ 10cm $\Rightarrow \frac{du}{dy} = -0.6(10) + 12 = 6\ s^{-1}$

@ 20cm $\Rightarrow \frac{du}{dy} = -0.6(20) + 12 = 0\ s^{-1}$

$x = \omega \int x^2 \cdot dA$

$\bar{h} = \omega(\bar{I}_G + A\bar{x}^2)$

$\therefore \bar{h} = \omega(I_{cm} + A\bar{x}^2)$

$\boxed{\bar{h} = \frac{I_G}{A\bar{x}} + \bar{x}} \Rightarrow$ centre of pressure

ssure: It is the fore pressure
ting on a surface either a plane
d shape. Which is in contact
e fluid is called Total pressure.
: pressure: It is the point of
essure. In other words it is
on of point of Total pressure.

Unsteady flow: In this flow the fluid properties like velocity etc. are not Consta with respect to time

i.e. $\frac{du}{dt} \neq 0$

Uniform flow: A flow in the the fluid properties with respect to space are Constant

i.e. $\frac{du}{ds} = 0$

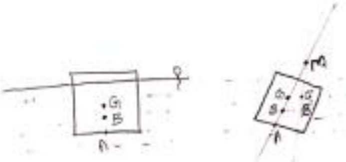
Non-uniform flow: The fluid flow in which the fluid properties with respect to space are not constant

i.e. $\frac{du}{ds} \neq 0$

Rotational flow: The fluid particles revolute ~~rotate~~ along its own axis also is known as

atent flow: If the fluid flows in a
ag manner it is called Turbulent flow.
yers crosses other layer. Re = >2500(P)>4000
ensional/twodimensional/three dimensional:
fluid flow is in one direction,
ection and three direction respectively
ensional u=(x,0,0), v=(x,0,0), w=(x,0,0)
nensional u=(x,y,0), v=(x,y,0), w=(x,y,0)
imensional u=(x,y,z), v=(x,y,z), w=(x,y,z)

ic height & Metacentre: When the
force of buoyancy of a body is inclined
ll degree by the inclination of
, the axis of force of buoyancy
ormal axis intersects at a
is called Metacentre and its
from the Centre of gravity is called
buoyancy. Metacentric height:



Metacentric height, GM = BM - BG

$$GM = \frac{I_o}{\forall} - BG$$

Here I_o = Moment of Inertia about
$\forall$ = Volume of water displaced to Submergence of body.

BG = AG - AB

Where AG = Centroidal distance from
AB = Centre of Buoyancy d
from base.