COURSE FILE

FLUID MECHANICS (CE-301)

CE- 2NDSEMESTER

ACADEMIC YEAR (2024-25)

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Professor

Department of Civil Engineering

Department of Civil Engineering

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CONTENTS

VISION OF THE INSTITUTE

To create a world - class institution.

MISSION OF THE INSTITUTE

To deliver exceptional value to students, industry & society.

VISION OF THE DEPARTMENT

To become a world class Department of Civil Engineering with demonstrated excellence in teaching, research, innovation and consultancy.

MISSION OF THE DEPARTMENT

1. To impart high quality instruction in civil engineering, equipping students with fundamental knowledge and capabilities to solve real-world problems.

2. To integrate academics, research, innovation, and entrepreneurship to create significant values for all stakeholders.

3. To develop meaningful linkages with world class organizations to constantly enhance capacity and capability.

SYLLABUS

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
CE-301	*Fluid Mechanics*	*Core*	*4*	*3*	*1*	*0*	*50*	*100*	*150*
Faculty Details	*niranjan.ash@mietjammu.in*								

Section A

Unit 1: *Fluid: Definition of fluid, Newton's law of viscosity, units and dimensions, Properties of fluids, mass density, specific volume, specific gravity, viscosity, compressibility and surface tension, control volume- application of continuity equation and momentum equation, incompressible flow, Bernoulli's equation and its applications.* **(9 Hrs)**

Unit 2: *Flow of fluid: Exact flow solutions in channels and ducts, couette and Poiseuille flow, laminar flow through circular conduits and circular annuli- concept of boundary layer - measures of boundary layer thickness – Darcy Weisbach equation, friction factor, Moody's diagram.*

(9 Hrs)

Unit 3: *Dimension Analysis: Need for dimensional analysis, methods of dimension analysis, types of similitude dimensionless parameters, application of dimensionless parameters, model analysis.*

(6 Hrs)

SECTION-B

Unit 4: *Pumps: Euler's equation, theory of rotodynamic machines, various efficiencies, velocity components at entry and exit of the rotor, velocity triangles. Centrifugal pumps, working principle, work done by the impeller, performance curves, cavitations in pumps, reciprocating pump, working principle.*

(8 Hrs)

Unit 5:*Turbines:Classification of water turbines, heads and efficiencies, velocity triangles (axial, radial) and mixed flow turbines- Pelton wheel, Francis and Kaplan turbines, working principles , draft tube, specific speed, unit quantities, performance curves for turbines, governing of turbines.*

(8 Hrs)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	*Fluid Mechanics and Machinery*	*C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli,*	*Oxford University Press*	*4th (2010)*
2.	*Fluid Mechanics and Hydraulic Machines*	*Sukumar Pati*	*McGraw Hill Education*	*10th (2020)*
3.	*Fluid Mechanics*	*Fox and McDonald*	*Wiley*	*8th (2015)*

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	*Fluid Mechanics Through Problems*	*R.J.Garde*	*New Age Publisher*	*7th (2018)*
2	*Fluid Mechanics*	*D.S.Kumar*	*Katson*	*4th (2012)*

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	*Mathematically analyze simple flow situations and get clear thoughts of the concept of continuity.*
CO2	*Analyze of various flow solutions and various boundary layers of bounding surface.*
CO3	*Comprehend the momentum equation & dimensional analysis.*
CO4	*To obtain the velocity/pressure variations and the application of mass and momentum conservation laws for fluid flows.*
CO5	*Evaluate the flow and performance of pumps and turbines*

CO-PO AND CO-PSO MATRIX

CO	*PO1*	*PO2*	*PO3*	*PO4*	*PO5*	*PO6*	*PO7*	*PO8*	*PO9*	*PO10*	*PO11*	*PO12*	*PSO1*	*PSO2*
1	*2*	*1*	*-*	*2*	*-*	*-*	*-*	*-*	*3*	*-*	*-*	*2*	*2*	*2*
2	*1*	*-*	*2*	*-*	*2*	*-*	*-*	*-*	*2*	*-*	*-*	*2*	*1*	*1*
3	*1*	*-*	*-*	*2*	*2*	*2*	*1*	*-*	*2*	*1*	*-*	*2*	*3*	*3*
4	*2*	*1*	*-*	*2*	*2*	*-*	*-*	*-*	*-*	*-*	*-*	*2*	*2*	*2*
5	*1*	*2*	*-*	*-*	*2*	*-*	*-*	*-*	*3*	*1*	*-*	*2*	*2*	*1*

COURSE PLAN

Unit-I Fluid and its properties		
S.No	**Topics**	**Recommended Books**
1	*Introduction to Fluids*	*Book 1, 2, Ch.1*
2	*Fluid Properties and Units*	*Book 1, 2, Ch.1*
3	*Control Volume and Continuity Equation*	*Book 1, 2, Ch.1*
4	*Momentum Equation and Incompressible Flow*	*Book 1, 2, Ch.1*
5	*Bernoulli's Equation and Applications*	*Book 1, 2, Ch.1*
6	*Fluid Dynamics and Viscosity*	*Book 1, 2, Ch.1*
7	*Compressibility and Surface Tension*	*Book 1, 2, Ch.1*
8	*Applications of Fluid Mechanics*	*Book 1, 2, Ch.1*
9	*Review and Integration*	*Book 1, 2, Ch.1*
Unit-II Flow of fluid		
10	*Exact flow solutions in channels and ducts*	*Book 1, Ch.2*
11	*Couette flow*	*Book 1, Ch.2*
12	*Poiseuille flow*	*Book 1, Ch.2*
13	*Laminar flow through circular conduits*	*Book 1, Ch.1*
14	*Laminar flow through circular annuli*	*Book 1, Ch.2*
15	*Concept of boundary layer*	*Book 2, Ch.2*
16	*Measures of boundary layer thickness*	*Book 2, Ch.2*
17	*Darcy Weisbach equation*	*Book 2, Ch.2*
18	*Friction factor*	*Book 2, Ch.2*
Unit-III : Dimension Analysis and Model analysis		
19	*Need for dimensional analysis*	*Book 2, Ch.3*
20	*Methods of dimension analysis*	*Book 2, Ch.3*
21	*Types of similitude*	*Book 2, Ch.3*
22	*Dimensionless parameters*	*Book 2, Ch.3*
23	*Application of dimensionless parameters*	*Book 2, Ch.3*
24	*Model analysis.*	*Book 2, Ch.3*
Unit-IV Centrifugal and Reciprocating pumps		
25	*Introduction of Pumps: Euler's equation, theory of rotodynamic machines*	*Book 2, Ch.5*
26	*Centrifugal pumps, working principle*	*Book 1, Ch.5*
27	*Pumps and primers, Breathing apparatus*	*Book 1, Ch.5*
28	*Work done by the impeller*	*Book 2, Ch.5*
29	*Performance curves*	*Book 1, Ch.5*
30	*Cavitations in pumps*	*Book 2, Ch.5*
31	*Reciprocating pump*	*Book 1, Ch.5*
32	*Working principle, Slip*	*Book 1, Ch.5*
Unit-V Hydraulic Turbines		
33	*Introduction to Turbines, classification of water turbines*	*Book 2, Ch.8*
34	*Heads and efficiencies*	*Book 1, Ch.8*
35	*velocity triangles (axial, radial) and mixed flow turbines*	*Book 2, Ch.8*
36	*Pelton wheel- working principles*	*Book 1, Ch.8*
37	*Francis and Kaplan turbines*	*Book 2, Ch.9*
38	*Draft tube, specific speed, unit quantities*	*Book 2, Ch.9*

39	*performance curves for turbines,*	*Book 2, Ch 9*
40	*Governing of turbines.*	*Book 2, Ch 9*

COURSE ASSESSMENT PLAN

Assessment		Weightage in Marks	CO Mapping
Internal	*Mid Semester Examination*	*20*	*CO1, CO2, CO3*
	Assignment	*20*	*CO4, CO5*
	Attendance	*10*	-
External	*Final Examination*	*100*	*All COs*

QUESTION BANK

S. No.	Question	CO	Blooms Level
	Unit 1		
1	*Q1: Define the following:* *a. Specific gravity* *b. Kinematic viscosity* *c. Discharge* *d. Impulse momentum principle* *e. Similitude*	*CO 1*	*1*
2	*Explain the difference between dynamic viscosity and kinematic viscosity, and provide their units of measurement.*		*2*
3	*A horizontal venturimeter with inlet diameter 200mm and throat diameter 100mm is employed to measure the flow of water. The reading of the differential manometer connected to the inlet is 180mm of mercury. If the coefficient of discharge is 0.98, determine the rate of flow.*		*3*
4	*The space between two square flat parallel plates is filled with oil. Each side of square plate is 720mm. The thickness of oil film is 15mm. The upper plate, which moves at 3 m/s, requires a force of 120 N to maintain the speed. Determine* *a. The dynamic viscosity of the oil.* *b. The kinematic viscosity of oil if the specific gravity of oil is 0.95.*		*3*
5	*Water is flowing through a pipe having diameter 600mm and 400mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 350KN/m^2 and the pressure at the upper end is 100KN/m^2. Determine the difference in datum head if the rate of flow through pipe is 60litre/sec.*		*4*
6	*A horizontal Venturimeter with inlet diameter 300mm and throat diameter 100m is employed to measure the flow of water. The intensity of pressure at inlet is 130KN/m^2 while the vacuum pressure head at the throat is 350mm of mercury. Assuming that 3% of head is lost between the inlet and the throat, find* *i. The value of C_d* *ii. Rate of flow*		*4*
	Unit 2		
1	*Define the concept of boundary layer thickness in fluid mechanics.*		*1*
2	*Explain how the Darcy-Weisbach equation is used to calculate head loss due*		*2*

	to friction in a pipe. Include the variables involved and their significance.		
3	*A fluid of viscosity 0.7 Ns/m^2 and specific gravity 1.3 is flowing through a circular pipe of diameter 100mm. The maximum shear stress at the pipe wall is given as 196.2 N/m^2, find* *i) the pressure gradient* *ii) the average velocity* *iii) Reynolds number of flow.*	*CO 2*	*3*
4	*A crude oil of viscosity 0.97 poise and relative density 0.9 is flowing through a horizontal pipe of diameter 100mm and of length 10m. Calculate the difference of pressure at the two ends of the pipe, if 100 kg of the oil is collected in a tank in 30 seconds.*		*3*
5	*Derive an expression for the velocity distribution for viscous flow through a circular a pipe. Also sketch the velocity distribution and shear stress distribution across a section of pipe.*		*5*
	Unit 3		
1	*List and define the three types of similitude used in fluid dynamics*	*CO 3*	*1*
2	*Determine the dimensions of the following quantities:* *i. Dynamic viscosity.* *ii. Work* *iii. Torque* *iv. Discharge* *v. Momentum*		*2*
3	*Derive on the basis of dimensional analysis suitable parameters to present the thrust developed by a propeller. Assume that the thrust P depends upon the angular velocity ω, speed of advance V, diameter D, dynamic viscosity μ, mass density ρ, elasticity of the fluid medium which can be denoted by the speed of sound in the medium C.*		*3*
4	*The discharge Q of a centrifugal pump depends upon the mass density of fluid (ρ), the speed of the pump (N), the diameter of the impeller (D), the manometric head (H) and the viscosity of the fluid (μ). Show that* $Q=ND^3\Phi\left(\frac{gH}{N^2D^2}, \frac{\mu}{\rho ND^2}\right)$		*4*
5	*Given a physical model and its full-scale prototype, analyze how changes in the Reynolds number in the model affect the accuracy of the results. Discuss the implications of these changes on the model's ability to represent the prototype accurately*		*4*
	Unit 4		
1	*Define the terms: suction head, delivery head, static head and manometric head.*	*CO 4*	*1*
2	*Explain the necessary precautions that can be taken to prevent cavitation in pumps and other fluid systems.*		*2*
3	*A centrifugal pump is to discharge 0.118m^3/s at a speed of 1450 r.p.m against a head of 25m. The impeller diameter is 250mm, its width at outlet is 50mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller.*		*3*
4	*How will you obtain an expression for the minimum speed for starting a centrifugal pump?*		*4*
5	*A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 r.p.m works against a total head of 40m. The*		*4*

	velocity of flow through the impeller is constant and equal to 2.5m/s. The vanes are set back at an angle of 40 degree at outlet. If the outer diameter is 500mm and width at outlet is 50mm, determine *1) Vane angle at inlet* *2) Work done by impeller on water per second* *3) Manometric efficiency*		
Unit 5			
1	*Define what a water turbine is and list the main types of water turbines.*	*CO 5*	*1*
2	*Explain the purpose of a draft tube in a hydraulic turbine system and describe how it contributes to the overall efficiency of the turbine.*		*2*
3	*Explain how you would apply the principles of turbine governing to control the speed and output of a hydraulic turbine. Include the methods for adjusting flow rates and the impact of these adjustments on turbine performance.*		*3*
4	*The penstock supplies water from a reservoir to the Pelton wheel with a gross head of 500m. One-third of the gross head is lost in friction in the penstock. The rate of flow of water through the nozzle fitted at the end of the penstock is 2* m^3*/s. The angle of deflection of the jet is 165°. Determine the power given by the runner and also hydraulic efficiency of the Pelton wheel. Take speed ratio=0.45 and* $C_v = 1.0$.		*4*
5	*The following data is given for a Francis Turbine. Net head H=60 m, Speed N=700 r.p.m, Shaft power=294.3 KW,* η_0*=84%,* η_h*=93%, flow rate = 0.20, breadth ratio n= 0.1, outer diameter of the runner=2×inner diameter of the runner. The thickness of the vanes occupies 5% of the circumferential area of the runner, velocity of flow is constant at inlet and outlet and discharge is radial at outlet. Determine: i) Guide blade angle, ii) Runner vane angles at inlet and outlet, iii) Diameters of runner at inlet and outlet, iv) Width of the wheel at inlet.*		*5*

SAMPLE ASSIGNMENT

Course Name – Fluid Mechanics
Course Code - CE-301
Maximum Marks - 20
Due Date: 15th September 2024

Question Number	Course Outcomes	Blooms' Level	Maximum Marks	Marks Obtained
Q1	*CO4*	*2*	*10*	
Q2	*CO5*	*4*	*10*	
Total Marks			*20*	
Faculty Signature: *Email:*				

Assignment Objectives:

The objective of this assignment is to deepen the understanding of digital electronics by exploring the concepts of finite state machines and A to D converters.

Assignment Instructions:

1. *Group A: 2023A1R001 to 2023A1R006*
2. *Assessment Rubrics: The evaluation will be done as per the rubrics.*
3. *Submission Method: All the students will submit their individual hard copy of assignment and upload the same on Camu LMS on or before the Due date. No late submissions will be considered for the evaluation.*

Guidelines for Each Question:

Clearly document your design process, including circuit diagrams, truth tables, and state diagrams. Ensure clarity and coherence in your documentation and presentation.

Q. No.	Question	BL	CO	Marks	Total Marks
1	*A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 r.p.m works against a total head of 40m. The velocity of flow through the impeller is constant and equal to 2.5m/s. The vanes are set back at an angle of 40 degree at outlet. If the outer diameter is 500mm and width at outlet is 50mm, determine* *1) Vane angle at inlet* *2) Work done by impeller on water per second* *3) Manometric efficiency*	*4*	*4*	*10*	*10*

2	*The penstock supplies water from a reservoir to the Pelton wheel with a gross head of 500m. One-third of the gross head is lost in friction in the penstock. The rate of flow of water through the nozzle fitted at the end of the penstock is 2 m^3/s. The angle of deflection of the jet is 165°. Determine the power given by the runner and also hydraulic efficiency of the Pelton wheel. Take speed ratio=0.45 and $C_v = 1.0$.*	*4*	*5* *5*	*10* *10*	*10* *10*

SAMPLE MID SEMESTER EXAMINATION

Course Name – Fluid Mechanics
Course Code - CE-301
Maximum Marks - 20
Time duration - 90 Mins
Instructions

- *Question 1, 2 and 4 are mandatory.*
- *Each question carries 4 marks.*

Q.No.	*Statement*	*Bloom's Level*	*CO Mapping*
1	*Explain the difference between dynamic viscosity and kinematic viscosity, and provide their units of measurement.*	*2*	*CO1*
2	*A fluid of viscosity 0.7 Ns/m^2 and specific gravity 1.3 is flowing through a circular pipe of diameter 100mm. The maximum shear stress at the pipe wall is given as 196.2 N/m^2, find* *i) the pressure gradient* *ii) the average velocity* *iii) Reynolds number of flow.*	*3*	*CO2*
3a	*Define the following:* *a. Specific gravity* *b. Kinematic viscosity* *c. Discharge* *d. Impulse momentum principle* *e. Similitude.*	*1*	*CO1*
3b	*A horizontal venturimeter with inlet diameter 200mm and throat diameter 100mm is employed to measure the flow of water. The reading of the differential manometer connected to the inlet is 180mm of mercury. If the coefficient of discharge is 0.98, determine the rate of flow.*	*3*	*CO1*
4	*A crude oil of viscosity 0.97 poise and relative density 0.9 is flowing through a horizontal pipe of diameter 100mm and of length 10m. Calculate the difference of pressure at the two ends of the pipe, if 100 kg of the oil is collected in a tank in 30 seconds.*	*3*	*CO2*
5a	*Derive on the basis of dimensional analysis suitable parameters to present the thrust developed by a propeller. Assume that the thrust P depends upon the angular velocity ω, speed of advance V, diameter D,*	*4*	*CO3*

	dynamic viscosity μ, mass density ρ, elasticity of the fluid medium which can be denoted by the speed of sound in the medium C.		
5b	*The discharge Q of a centrifugal pump depends upon the mass density of fluid (ρ), the speed of the pump (N), the diameter of the impeller (D), the manometric head (H) and the viscosity of the fluid (μ). Show that* $Q=ND^3\Phi\left(\frac{gH}{N^2D^2},\frac{\mu}{\rho ND^2}\right)$	*4*	*CO3*

ANNEXURE A

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. *Successfully apply fundamental knowledge of Civil Engineering in an innovative manner to solve complex problems.*
2. *Build successful careers in diverse domains.*
3. *Demonstrate professional growth and development in their chosen field and/or progress towards an advanced degree.*
4. *Build reputation for excellence, leadership and ethics.*

PROGRAMME OUTCOMES (POs)

1. *Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
2. *Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.*
3. *Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.*
4. *Conduct investigations of complex problems: Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
5. *Modern tool usage: Select/Create and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling to complex engineering activities, taking comprehensive cognizance of their limitations.*
6. *The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.*
7. *Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.*

8. *Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the relevant scientific and/or engineering practices.*
9. *Individual and teamwork: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.*
10. *Communication: Communicate effectively on complex engineering activities with the engineering community and with the society-at-large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.*
11. *Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
12. *Life-long learning: Recognize the need for and above have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological changes.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

1. *Demonstrate fundamental knowledge in Civil Engineering by applying it in diverse domains of Structural Engineering, Hydrology and Environmental Engineering, Transportation Engineering and other allied domains.*
2. *Demonstrate competence in designing, implementing and testing civil structures in different environments by utilizing modern methodologies and advanced technologies as per industry norms and standards.*

ANNEXURE B

BLOOM'S TAXONOMY

Bloom's Taxonomy is a hierarchical framework used to classify educational objectives and learning outcomes. Each level of Bloom's Taxonomy represents a progressively higher level of cognitive complexity and sophistication. Educators use this framework to design curriculum, assess learning objectives, and create activities that promote higher-order thinking skills. By targeting different levels of Bloom's Taxonomy, educators can ensure a balanced approach to teaching and learning that fosters deep understanding and critical thinking across various subjects and disciplines.

S.No	*Level of Learning*	*Characteristics of Learning*	*Verbs in Questions or Learning Outcomes*
1.	*Remembering*	*This level involves recalling facts, basic concepts, or specific information without necessarily understanding or interpreting it.*	*List, Identify, Outline*
2.	*Understanding*	*At this level, students demonstrate comprehension and grasp of the meaning of information. They can explain ideas or concepts in their own words, interpret data, and summarize information.*	*Explain, Describe, Interpret, Distinguish*
3.	*Applying*	*Students can use acquired knowledge in new situations or contexts. They can apply concepts, principles, or procedures in a different way or to solve problems.*	*Apply, Calculate, Solve*

4.	*Analyzing*	*This level involves breaking down information into its constituent parts and examining relationships between them. Students can identify patterns, organize information, and make connections between ideas.*	*Classify, Derive, Explain*
5.	*Evaluating*	*At this level, students can make judgments about the value or quality of ideas, theories, or solutions based on criteria and standards. They can assess the strengths and weaknesses of arguments, methods, or designs.*	*Determine, Optimize, Evaluate*
6.	*Creating*	*The highest level of Bloom's Taxonomy involves generating new ideas, products, or ways of thinking. Students can design, compose, or invent based on existing knowledge and skills, demonstrating creativity and originality.*	*Formulate, Design, Create*

ANNEXURE C

ASSIGNMENT GUIDELINES

1. *Title Page: Use the Standardized Front Page shared by the Department.*
2. *Font and Spacing: Use a Times New Roman in 12-point size. 1.5 line spacing in the entire document, including the title page, headings, and references.*
1. *Margins: Set 1-inch (2.54 cm) margins on all sides of the paper.*
2. *Header: Include a header as Assignment and Course Code in the top right corner of each page (except the title page).*
3. *Title: Center the title of your assignment at the top of the first page. It should be bold and in title case (capitalize major words).*
4. *Headings: Use headings and subheadings to organize your content. Typically, use bold for main headings (e.g., "Introduction") and italics for subheadings (e.g., "Methods").*
5. *Page Numbers: Page numbers should be placed in the footer of each page, starting from the second page (the title page is page 1).*
6. *Citations and References: Use a consistent APA citation style to cite references.*
7. *Pagination and Length: The minimum length of the assignment should be 2000 words excluding the references.*
8. *Figures and Tables: If you include figures or tables, provide clear labels and captions.*
9. *Figure number should be placed below the Figure as Figure,1 and for the tables, the table number must be mentioned above the table as Table I.*
10. *Appendices (if needed): Include appendices for supplementary materials, such as charts, graphs, or lengthy data tables.*
11. *Submission Format: Submit your assignment in the soft copy format as PDF and upload it on CAMU as per the submission deadline. Please ensure that the assignment is renamed as Roll No.*

12. *Proofreading and Editing: Carefully proofread and edit your assignment for clarity, grammar, and spelling errors before submission.*
13. *Plagiarism must be below 15 percent for the assignment submitted.*

ASSIGNMENT RUBRICS

Parameters	Criteria					Marks Distribution
	1	2	3	4	5	
Writing Skills **a) Content**	*The content was not relevant to the given task*	*The content was minimally relevant to the given task*	*The content was generally relevant to the given task*	*The content was relevant to the given task*	*The content was very relevant to the given task*	**2**
b) Organization	*The assignment is poorly organized and lacked supporting evidence*	*The organization of the assignment is some what organized with minimal supporting evidence*	*The organization of the assignment is acceptable with some supporting evidence*	*The organization of the assignment is well organized and supported*	*The assignment is very well organized and supported*	**2**
c) Grammar-Mechanics-Usage- Spelling	*Too many grammatical errors*	*Numerous grammatical errors*	*Several grammatical errors*	*Few grammatical errors*	*No grammatical errors*	**1**
Knowledge Skills	*Student does not demonstrate the subject knowledge*	*Student demonstrates some grasp of the subject knowledge*	*Student demonstrates moderate level of the subject knowledge*	*Student demonstrates sufficient level of the subject knowledge*	*Student demonstrates sound subject knowledge*	**5**
Overall Presentation/Viva	*Unable to answer questions, not prepared and confidence at all*	*Able to answer questions but not prepared and confidence*	*Presentation is acceptable but there are some areas that could be improved. / Able to answer questions but with little preparation and confidence*	*Presentation is of good quality, with a clear effort to present the work professionally and effectively. / Able to answer questions well and slightly confidence and well prepared*	*Presentation (including code structure, comments, user interface, and documentation) is of exceptionally high quality. / Able to answer questions very well and confidently. Very well prepared*	**10**

ANNEXURE D

ATTENDANCE GUIDELINES

S.No	Attendance Percentage	Marks to be Allotted
1	*Above 90%*	*100 %*
2	*Above 85% - 90%*	*80 %*
3	*75% -85%*	*60%*
4	*Below 75%*	*0*