Course Specifications: Fluid Mechanics MPE171

1. **Basic Information**

Program Title	Biomedical Engineering
Department offering the Program	Biomedical Engineering
Department Responsible for the Course	Mechanical Power Engineering
Course Code	MPE171
Year/ Level	Level 100
Specialization	Minor
Requirements	MTH011
Authorization data of course specification	

Teaching Hours	Credit hours	Lectures	Tutorial	Practical
	3	2	1	1.5

2. Course aims:

No.	Aim
1	Apply knowledge of mathematics, and engineering concepts to solve fluid mechanic problems.
6	Use the accumulated knowledge to implement all the phases of the development life cycle of fluid mechanics.

3. Intended Learning Outcomes (ILOs):

A. Knowledge and Understanding:

No.	Knowledge and Understanding
A_1	Identify the concepts and theories of mathematics and sciences, concerning the hydraulic systems.
A_5	State the methodologies of solving hydraulic problems, data collection and interpretation.

B. Intellectual Skills

No.	Intellectual Skills
B_1	Select appropriate mathematical and computer-based methods for modeling and analyzing fluid mechanics problems.
B_5	Assess and evaluate the characteristics and performance of hydraulic components and systems.

C. Professional Skills

No.	Professional Skills
C_1	Apply integrally knowledge of mathematics, science, information technology, design, and engineering practice to solve fluid mechanics problems.
C_2	Merge the engineering knowledge, understanding, and feedback in a professional manner to improve the hydraulic systems.

D. General Skills

No.	General Skills
D_1	Collaborate effectively within multidisciplinary team within practical.
D_3	Communicate effectively through discussion sessions and written reports.

4. Course Contents:

No.	Topics	Week
1	Introduction	1-2
2	Hydrostatics	3-4
3	Momentum Principal, Control Volume Analysis	5
4	Bernoulli's Equation	6
5	Mechanical Energy Equation	7,9
6	Similitude, Dimensional Analysis, and Modeling	10-11
7	Internal Flow in Ducts	12
8	Pumps and Turbines	13

9	External Flow	14

5. Teaching and Learning Methods

No.	Teaching Method
1	Lectures
2	Discussion Sessions
3	Information Collection from Different Sources
4	Practical
5	Research Assignment

6 Teaching and Learning Methods for disabled students

No.	Teaching Method	Reason
1	Course notes are available in the form of a presentation, in preparation of e-learning	To help them work from home

7. Student Evaluation:

7.1 Student Evaluation Methods:

No.	Evaluation Method	ILOs
1	Mid Term Examination	A_1, B_1, C_1
2	Practical Examination	B_5, C_5, D_1
3	Semester work (quizzes, lab)	A_1, A_5, B_1, B_5, C_1, C_2, D_3
4	Final Term Examination	A_1, B_1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8
2	Practical Examination	13
3	Semester work	Every week
4	Final Term Examination	15

7.3 Weighting of Evaluations:

No.	Evaluation Method	Weights
1	Mid Term Examination	25%
2	Practical Examination	10%
3	Semester work	15%
4	Final Term Examination	50%
Total		100%

8. List of References

No.	Reference List
1	Fluid Mechanics, Frank White, 7th edition, McGraw Hill, 2010
2	Fundamentals of fluid mechanics, Munsen et al., Wiley, 2012
3	Course notes

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Sound System

5	Wireless Internet
6	Lab Facilities
7	Visualizer

10. Matrix of Knowledge and Skills of the Course:

No.	Topic	Aim	Knowledge &Understanding	Intellectual Skills	Professional Skills	General Skills
1	Introduction	1,6	A_1			
2	Hydrostatics	1	A_1	B_1	C_1	D_3
3	Momentum Principal, Control Volume Analysis	1	A_1	B_1	C_1	D_3
4	Bernoulli's Equation	1,6	A_1	B_1	C_1	D_3
5	Mechanical Energy Equation	1	A_1	B_1	C_1	D_3
6	Similitude, Dimensional Analysis, and Modeling	1	A_1, A_5	B_1	C_1, C_2	D_3
7	Internal Flow in Ducts	6	A_1, A_5	B_1, B_5	C_1, C_2	D_1, D_3
8	Pumps and Turbines	1	A_1, A_5	B_1, B_5	C_1, C_2	D_1, D_3
9	External Flow	1	A_1, A_5	B_1, B_5	C_1, C_2	D_1, D_3

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Date of Approval