



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with 'A' grade by NAAC
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119.



Department of Mechatronics Engineering

School of Mechanical Engineering

Minutes of Board of Studies Meeting held on 08-06-2019 (Saturday)

Meet Time: 10.00 a.m. to 12.30 noon

The meeting started with the welcome address delivered by Dr. S. Prakash, Professor and Dean (Session Chair). He introduced the new courses offered to mechatronics engineering students to the BOS panel members. The following are the BOS members were present during the Mechatronics Engineering BOS meeting.

Sl. No.	Name	Designation	Institution	Role
1	Dr. S. Prakash	Professor and Dean	Sathyabama Institute of Science & Technology	Chair person
2	Dr. L. Vijayaraghavan	Professor	IIT Madras, Chennai	BoS Member (External)
3	Dr. N. Ganesh Kumar	Associate Professor	PSG Tech, Coimbatore	BoS Member (External)
4	Dr. S. Sivasaravanan	Associate Professor	Sathyabama Institute of Science & Technology	Member
5	Mrs. M Sangeetha	Assistant Professor	Sathyabama Institute of Science & Technology	Member
6	Mr. J. R. Deepak	Assistant Professor	Sathyabama Institute of Science & Technology	Member
7	Dr. J. Lilly Mercy	Assistant Professor	Sathyabama Institute of Science & Technology	Member
8	Mr. V. Jayaprakash	Assistant Professor	Sathyabama Institute of Science & Technology	Member
9	Mr. J. Senthil Kumar	Assistant Professor	Sathyabama Institute of Science & Technology	Member
10	Mr. M Vigneshwar	Students	Sathyabama Institute of Science & Technology	Student Member
11	Mr Aman Dinodya	Students	Sathyabama Institute of Science & Technology	Student Member

Agenda for the BOS Meeting:

Newly proposed programs – B.E Mechatronics Engineering – Expert Review and Comments on the syllabus

The BOS meeting has been convened to frame the new regulation for the proposed program B.E Mechatronics Engineering which is to be implemented for the Academic Year 2019-2020.

- Dr. J. Lilly Mercy proposed a new course entitled **Mechanics of Fluids** based on the futuristic requirements for the students of Mechatronics Engineering. She explained the need in bringing the course for Mechatronics Engineer, stating that this course develops the skill among the graduates by imparting a thorough idea on nature of flowing medium in the field of fluid mechanics. Moreover this course improves the employability for the graduates in core companies/industries.

- Dr. L. Vijayaraghavan, Professor, IIT Madras and Dr. N. Ganesh Kumar, Associate Professor PSG Tech, appreciated the internal members for analyzing the need of each and every course in the curriculum keeping the graduates outcome in mind and accepted for the approval of introducing **Mechanics of Fluids** new course in the curriculum.

- **NEW COURSE ENTITLED MECHANICS OF FLUID**

SMR1201 MECHANICS OF FLUID

L	T	P	Credits	Total	Marks
3	1	0	4		100

COURSE OBJECTIVES

- To understand fluid properties, flow characteristics and basic governing equations-mass, momentum, energy.
- To understand types of flow and boundary layer concept.

UNIT 1 FLUID PROPERTIES AND FLUID STATICS

9 Hrs.

Fluid - definition, distinction between solid and fluid - Units and dimensions – Properties of fluids - density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapor pressure, capillary and surface tension. Fluid statics: Pascal law - Hydrostatic law – Relative equilibrium - Pressure measurements using Manometers and pressure gauges - Forces on immersed plane and curved surfaces – Buoyancy –Meta-centre - Stability of floating and submerged bodies

UNIT 2 FLUID KINEMATICS AND FLUID DYNAMICS

9 Hrs.

Fluid Kinematics – Lagrangian and Eulerian descriptions - Flow visualization - Lines of flow -Types of flow - Flow characteristics – concept of control volume - velocity field and acceleration –continuity equation – energy equation – momentum equation – Impact of - Euler's equation along streamline - Bernoulli's equation– Applications - Venturi meter, Orifice meter, Pitot tube.

UNIT 3 FLUID FLOW AND DIMENSIONAL ANALYSIS

9 Hrs.

Laminar flow between parallel plates - Laminar flow through circular tubes (Hagen Poiseuille equation) - Turbulent Flow in a pipe – Boundary layer concepts – types of boundary layer thickness -Hydraulic and energy gradient - Darcy Weisbach equation - Pipe roughness – Friction factor -Moody's diagram minor losses - Flow through pipes in series and in parallel. Dimension and units -Buckingham π theorem - Discussions on dimensionless parameters – applications - Laws of models and similitude.

UNIT 4 HYDRAULIC TURBINES

9 Hrs.

Fluid machines: definition and classification - exchange of energy - Euler's equation for turbomachines - Construction of velocity vector diagram's - head and specific work - components of energy transfer - degree of reaction. Hydro turbines: definition and classifications - Pelton turbine -Francis turbine – propeller turbine - Kaplan turbine - working principles - velocity triangles - work done – specific speed -efficiencies -performance curve for turbines

UNIT 5 HYDRAULIC PUMPS

9 Hrs.

Pumps: definition and classifications - Centrifugal pump: classifications, working principles, velocity triangles, specific speed, efficiency and performance curves - Reciprocating pump: classification, working principles, indicator diagram, and work saved by air vessels and performance curves -Cavitations in pumps.

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Evaluate the hydrostatic stability of floating and submersible bodies.
- CO2 - Apply the Bernoulli's equation of fluid motion to flow measuring devices.
- CO3 - Evaluate the hydraulic coefficients and the energy losses in pipes.
- CO4 - Analyze the performance characteristics of centrifugal and reciprocating pumps.
- CO5 - Interpret the performance characteristics of hydraulic turbines.
- CO6 - Predict the performance of prototype with dimensional analysis.

TEXT / REFERENCE BOOKS

1. White, F.M., "Fluid Mechanics", Tata McGraw-Hill, 7th Edition, New Delhi, 2011.
2. Douglas J.F., Gasorick J.M., (et.al), "Fluid Mechanics", Pearson India, 5th Edition, 2008.
3. Cengel Y.A., Cimbala J.M., " Fluid Mechanics – Fundamentals and applications", McGraw Hill higher education, 2nd Edition, 2010.
4. Modi P.N., Seth S.M., "Hydraulics and fluid mechanics including hydraulic machines", Standard publishers, 20th edition, 2015

5. Bansal, R.K., "Fluid Mechanics and Hydraulics Machines", (9th edition), Laxmipublications (P) Ltd., New Delhi, 2011.
6. Som, S.K., and Biswas, G., "Introduction to fluid mechanics and fluid machines", TataMcGrawHill, 2nd edition, 2007.
7. Kumar, K.L., "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd, New Delhi (7th edition), 2008.
8. Ramamirtham, S., "Fluid Mechanics and Hydraulics and Fluid Machines", Dhanpat Rai and Sons, Delhi, 2006.

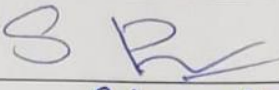
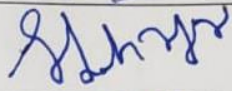
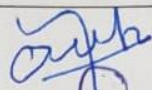
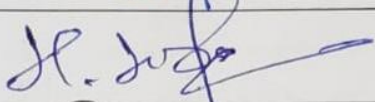
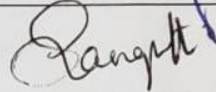

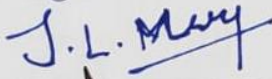
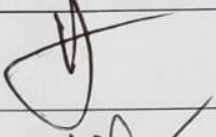
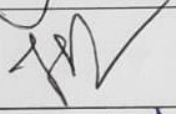

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100 Exam Duration: 3 Hrs

PART A: 2 Questions from each unit, each carrying 2 marks 20 Marks

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks 80 Marks

• Signature of BOS members

Sl. No.	Name	Signature
1	Dr. S. Prakash	
2	Dr.L.Vijayaraghavan	
3	Dr.N.Ganesh Kumar	
4	Dr. S. Sivasaravanan	
5	Mrs. M Sangeetha	
6	Mr. J. R. Deepak	
7	Dr. J. Lilly Mercy	
8	Mr. V. Jayaprakash	
9	Mr. J. Senthil Kumar	
10	Mr. M Vigneshwar	
11	Mr Aman Dinodya	