Department of Mechanical Engineering

Minutes of Board of Studies Meeting

The 5th Board of Studies meeting of Department of Mechanical Engineering was held on 8th October 2022 at 10:30 A.M in the R&D Lab, Department of Mechanical Engineering, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting:

Sl. No	Name of the Member with Designation and official Address	Responsibility in the BoS
1	Dr. K.Velmurugan Professor and Head Department of MECH, SMVEC	Chairman
External Members		
2	Dr. N. Alagumurthi, Ph.D, Professor & Head Department of Mechanical Engineering, Pondicherry Engineering College, Puducherry-605014. Email id: alagumurthi@pec.edu Mobile No.: 9486143090	University Nominee
3	Dr. M. Leenus Jesu Martin, Ph.D, Director for campus SRM Institute of Science and Technology, Tamil Nadu – 603203 Email id: leenusm@srmist.edu.in Mobile No.: 9940036021	Member
4	Dr. A.T. Ravichandran, Ph.D, Dean Academics and Dean School of Mechanical and Construction Engineering Vel Tech Rangarajan Dr.Sagunthala R & D Institute of Science and Technology, Avadi, Chennai – 600062 Email id: atrmathy@gmail.com Mobile No.: 9942940600	Member

Internal Members		
5	Dr. G.G.Sozhamannan, Professor, Specialization: *Manufacturing Engineering*	Member
6	Dr.T.Coumaressin, Associate Professor, Specialization: *Thermal Engineering*	Member
7	Dr. K.Hemalatha, Associate Professor, Specialization: *Engineering Design*	Member
8	Dr.A.Thiagarajan, Associate Professor, Specialization: Product Design & Manufacturing	Member
9	Prof.B.Kanimozhi, Professor, Specialization: Mathematics	Member
10	Prof.K.Oudayakumar Associate Professor, Specialization: Physics	Member
11	Dr.K.Karthikeyan Associate Professor, Specialization: Chemistry	Member
12	Dr.D.Jaichitra, Professor, Specialization: English	Member
Co-opted Members		
13	Dr. Anand Gurupatham General Manager, CAE-Department Head at Renault Nissan, Technology & Business Center, Chennai, Tamil Nadu, India	Industrial Member
Alumni		
14	Mr.P.Madavan, Research Scholar MIT, Anna university, Chennai.	Alumni Member

AGENDA OF THE MEETING

Item No. : BOS / 2022/MECH/UG /5.1	
	Consideration of confirmation of minutes of the previous meeting held on 11TH March 2022
Item No. : BOS / 2022/MECH/UG /5.2	
	Consideration of the note on action taken on the decisions of the previous meeting
Item No. : BOS / 2022/MECH/UG /5.3	
	Consideration of revision of curriculum and syllabus of B.Tech. Mechanical to be offered under Regulations 2020 to the students admitted in the academic year 2021-22
Item No. : BOS / 2022/MECH/UG /5.4	
	Consideration of revision of list of panel of question paper setters and Examiners for the examinations of UG and PG Programmes for the academic year 2022-23
Item No. : BOS / 2022/MECH/UG /5.5	
	Consideration of Skill Development Courses and Certification Courses
Item No. : BOS / 2022/MECH/UG /5.6	
	Consideration of assessment of quality of question papers of U.G. Programme drawn in previous examinations
Item No. : BOS / 2022/MECH/UG /5.7	
	Consideration of review of feedback received from various stakeholders like parents, alumni, Industries Experts etc.
Item No. : BOS / 2022/MECH/UG /5.8	
	Consideration of results analysis May-2022
Item No. : BOS / 2022/MECH/UG /5.9	
	Consideration of offering of Professional and Open electives in V and VIII semester students in the Academic Year 2022-23.
Item No. : BOS / 2022/MECH/UG /5.10	
	To consider and approve the department committee to monitor the Academic Activities
Item No. : BOS / 2022/MECH/UG /5.11	
	Any other item with the permission of chair

UG Minutes of the Meeting

Dr. K. Velmurugan, Chairman, BoS opened the meeting by welcoming and introducing the external members, to the internal and co-opted members and thanked them for accepting the invitation to attend the Board of Studies meeting and the meeting thereafter deliberated on agenda items that has been approved. The following points were discussed in the meeting.

UG/Item 5.1	**Consideration of confirmation of minutes of the previous meeting held on 11TH March 2022** • The committee overviewed the previous meeting discussions and approved
UG/Item 5.2	**Consideration of the note on action taken on the decisions of the previous meeting** • Corrections carried in the previous BOS meeting were presented before the members; The BOS members approved the same.
UG/Item 5.3	**Consideration of revision of curriculum and syllabus of B.Tech. Mechanical to be offered under Regulations 2020 to the students admitted in the academic year 2021-22** • The Curriculum and syllabus of the Regulation 2020 were approved by the BOS members
UG/Item 5.4	**Consideration of revision of list of panel of question paper setters and Examiners for the examinations of UG and PG Programmes for the academic year 2022-23** • The BOS members approved the question paper setters and examiners list
UG/Item 5.5	**Consideration of Skill Development Courses and Certification Courses** • The Skill development courses and certification courses were approved by the members • The BOS members insisted that in employability enhancement course Ansys with Matlab simulations should be given to students, which will be useful for students employability
UG/Item 5.6	**Consideration of assessment of quality of question papers of U.G. Programme drawn in previous examinations** • The question papers and their Blooms taxonomy levels were discussed, the members expressed their satisfaction
UG/Item 5.7	**Consideration of review of feedback received from various stakeholders like parents, alumni, Industries Experts etc.** • The feedbacks were reviewed by the members
UG/Item	**Consideration of results analysis May-2022**

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5.8	• **The results were presented before the members** • The BOS members recommended that,Re-exams/supplementary exams can be conducted for I year students, as a token of motivation and encouragement to clear their arrears and carry forward their degree enthusiastically
UG/Item 5.9	**Consideration of offering of Professional and Open electives in V and VIII semester students in the Academic Year 2022-23.** • The Professional and Open electives in V and VIII semester for the Academic Year 2022-23 were presented, the members approved the same
UG/Item 5.10	**To consider and approve the department committee to monitor the Academic Activities** • The department committee and the role and responsibilities of the committee were presented before the members, they approved the same.
UG/Item 5.11	**Any other item with the permission of chair:** 1. The BOS members strongly insisted that, students should be trained on Matlab lab scripting and simulations to pursue their career in the embedded system environment 2. Python programming along with domain knowledge is mandatory for the students employability 3. The theory courses in the VIII semester may be avoided, instead students can be sent for internships and projects 4. Students can be insisted to do vocational courses in their domain in IITs during their course of study 5. Automation training center, Home appliance lab, Electric vehicle lab other facilities available in the reputed institutions / universities can be utilized by our students by getting prior permission from the University 6. Students may be given flexibility to change their final year phase II project from the Phase I during exceptional conditions like placement and internships 7. The BOS members insisted that Alumni committee should be active in promoting the institution 8. Alumni chapters to be established in and round country, separate calendars for alumni activities can also be maintained 9. Incubation cell to be maintained with Entrepreneurship Development Cell, where students Ideas can be converted into products and patented 10. Online guest lectures can be regularly arranged by fixing international and national level resource persons 11. The Two courses were modified based on the teachers feedback and its enclosed **(Annexure-I)**

The V BOS meeting was concluded at 01:30 PM with vote of thanks by Dr. K. Velmurugan, Head of Department, and Mechanical Engineering

Sl. No	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	Dr. K.Velmurugan Professor and Head Department of MECH, SMVEC	Chairman	
External Members			
2	Dr. N. Alagumurthi, Ph.D, Professor & Head Department of Mechanical Engineering, Pondicherry Engineering College, Puducherry-605014. Email id: alagumurthi@pec.edu Mobile No.: 9486143090	University Nominee	
3	Dr. M. Leenus Jesu Martin, Ph.D, Director for campus SRM Institute of Science and Technology, Tamil Nadu – 603203 Email id: leenusm@srmist.edu.in Mobile No.: 9940036021	Member	
4	Dr. A.T. Ravichandran, Ph.D, Dean Academics and Dean School of Mechanical and Construction Engineering Vel Tech Rangarajan Dr.Sagunthala R & D Institute of Science and Technology, Avadi, Chennai – 600062 Email id: atrmathy@gmail.com Mobile No.: 9942940600	Member	(On-line)
Internal Members			
5	Dr.G.G.Sozhamannan, Professor, **Specialization:** ***Manufacturing Engineering***	Member	
6	Dr.R.Ravishankar, Associate Professor, **Specialization:** ***Thermal Engineering***	Member	

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7	Dr.K.Hemalatha, Associate Professor, **Specialization:** ***Engineering Design***	Member	
8	Dr.A.Thiagarajan, Associate Professor, **Specialization:** ***Product Design & Manufacturing***	Member	
9	Dr.B.Kanimozhi Professor, **Specialization:** ***Mathematics***	Member	
10	Prof.K.Oudayakumar Associate Professor, **Specialization:** ***Physics***	Member	
11	Dr.K.Karthikeyan Associate Professor, **Specialization:** ***Chemistry***	Member	
12	Dr.D.Jaichithra, Professor, **Specialization:** ***English***	Member	
Co-opted Members			
13	Dr. Anand Gurupatham Deputy General Manager, CAE-Department Head at Renault Nissan, Technology & Business Center, Chennai, Tamil Nadu, India	Industrial Member	
Alumni			
14	Mr.P.Madavan, Research Scholar MIT, Anna university, Chennai.	Alumni Member	

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U20MET615 **FINITE ELEMENT ANALYSIS**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To learn the basic principles of finite element analysis procedure.
- To understand the concepts of discretization
- To learn the theory and characteristics of finite elements that represent engineering structures.
- To understand the nature of iso-parametric and iso-perimetric elements
- To learn and apply finite element solutions to structural, thermal, dynamic problem

Course Outcomes

After completion of the course, the students will be able to

CO1 - Discuss the concepts behind various methods and weighted residual methods in FEM. **(K2)**
CO2 - Describe the discretization concepts. **(K2)**
CO3 - Identify the application and characteristics of FEA elements such as bars, beams, plane and isoperimetric elements, and 3-D element. **(K4)**
CO4 - Compare the iso-parametric and iso-perimetric elements. **(K4)**
CO5 - Identify how the finite element method expands beyond the structural domain, for problems involving in structural dynamics, heat transfer and fluid flow. **(K4)**

UNIT I INTRODUCTION **(9 Hrs)**

Finite element method, stress and equilibrium, strain – displacement relations, stress – strain relations, plane stress and plane strain conditions, weighted residual methods, concept of potential energy.

UNIT II ONE DIMENSIONAL **(9 Hrs)**

Element shapes, discretization procedures, assembly of stiffness matrix, bandwidth, node numbering, mesh generation, interpolation functions, and local and global coordinates, convergence requirements, and treatment of boundary conditions- one dimensional problems.

UNIT III ANALYSIS OF TRUSSES **(9 Hrs)**

Finite element modeling coordinates and shape functions, assembly of global stiffness matrix and load vector, finite element equations, simple problems on beams. Modeling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions, formulation of axisymmetric problems.

UNIT IV HIGHER ORDER AND ISOPARAMETRIC ELEMENTS **(9 Hrs)**

One dimensional quadratic and cubic elements in natural coordinates, two dimensional four nodded isoperimetric elements and numerical integration.

UNIT V STEADY STATE HEAT TRANSFER ANALYSIS **(9 Hrs)**

One-dimensional analysis of a fin and two dimensional analysis of thin plate, analysis of a uniform shaft subjected to torsion. Dynamic Analysis: Formulation of finite element model, element consistent and lumped mass matrices, evaluation of Eigen values and Eigen vectors, free vibration analysis.

Text Books

1. Tirupathi R. Chandrupatla, Ashok D. Belegundu, Introduction to Finite Elements in Engineering, 4th Edition, Prentice Hall, 2012.
2. Singiresu S Rao,The Finite Element Methods in Engineering, 6th Edition, Elsevier Butterworth – Heinemann, 2017.
3. Reddy. J.N., "An Introduction to the Finite Element Method", 3rd Edition, Tata McGraw-Hill, 2005.

Reference Books

1. P.Seshu, "Text Book of Finite Element Analysis", 3rd Edition, Prentice-Hall of India Pvt. Ltd., New Delhi, 2007.
2. G.Ramamurthy, "Applied Finite Element Analysis", 2nd Edition, Wiley Publication, 2010.
3. S.Siddu, Anup Goel, Parmeshwar Patil, N. I. Jamader, "Finite Element Analysis", Technical publications, 2019.

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4. C.S.Krishnamurthy, "Finite Element Analysis", Tata McGraw-Hill, 2000.
5. Robert D Cook, David S Malkus, Michael E Plesha, "Concepts and Applications of Finite Element Analysis", 4th edition, John Wiley and Sons, Inc., 2003.

Web References

1. https://nptel.ac.in/courses/112104193/
2. https://www.coursera.org
3. https://www.featutorials.com
4. https://www.sciencedirect.com/topics/engineering/finite-element-analysis
5. https://www.comsol.co.in/multiphysics/finite-element-method

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	1	-	-	-	-	-	1	3	2	1
2	3	2	2	2	2	1	-	-	-	-	-	1	3	2	1
3	3	2	2	2	2	1	-	-	-	-	-	1	3	2	1
4	3	2	3	2	2	1	-	-	-	-	-	1	3	2	1
5	3	2	2	2	2	1	-	-	-	-	-	1	3	2	1

Correlation Level: 1- Low, 2 - Medium, 3 - High

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U20MEP506 **METROLOGY AND MEASUREMENTS LAB**

L	T	P	C	Hrs
0	0	2	1	30

Course Objectives

- To acquaint practical knowledge on various measuring and calibrating devices.
- To familiarize with different measurement equipment's and its usage in industry for quality inspection.
- To explore the working principle of mechanical measuring devices.
- To understand the importance of accurate measurements in the industrial inspection.
- To give exposure and hands on experience about the metrology of tooling.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Calibrate the vernier, micrometer and slip gauges for the inspection. **(K1)**

CO2 - Measure the gear tooth dimensions, angle using sine bar, straightness and flatness, thread parameters, temperature using thermocouple, force, displacement, torque and vibration. **(K1)**

CO3 - Organize experimental investigation of performance of strain gauges, LVDT, Accelerometer, Stroboscope and profile projector. **(K3)**

CO4 - To relate measuring accuracy of different instruments according to the suitability. **(K2)**

CO5 - To extract the results of measurement performed by different equipment's. **(K2)**

List of Experiments

1. Study of Vernier Caliper, Micrometer
2. Study of Vibration Measurement using Accelerometer.
3. Study of Profile projector
4. Study of Coordinate Measuring Machines (CMM) for various elements.
5. Calibration of Vernier caliper, Micrometer and Height gauge.
6. Measurement of Wedge angle using Sine Bar.
7. Measurement of Thread Parameter Using Tool Maker's Microscope
8. Measurement of Strain using Strain Gauges.
9. Measurement of Pressure using Strain Gauges.
10. Characteristics of Thermocouple
11. Characteristics of Load cell.
12. Characteristics of LVDT
13. Measurement of speed using stroboscope
14. Inspection of gear tooth using profile projectors

Reference Books

1. R.K.Rajput, S.K.Kataria and Sons, Mechanical measurements and instrumentations, S.K.Kataria and Sons, New Delhi, 2013.
2. R.V.Jalgaonkar, Mechanical measurements and Control, Everest publications, New Delhi, 2010.
3. R.K.Jain, Mechanical and Industrial measurements, Khanna publications, New Delhi, 2010.
4. Rega Rajendira ,"Principles of Engineering Metrology", Jaico Publishing House, 2008
5. Backwith, Marangoni, Lienhard, "Mechanical Measurements", Pearson Education , 2006

Web References

1. https://www.vlab.co.in/participating-institute-iit-bombay
2. http://209.211.220.205/
3. https://sites.google.com/view/vlab-bnmitmech/home
4. https://sites.google.com/site/metrologylabktrsrm/list-of-experiments
5. https://www.bitswgl.ac.in/lab-manuals-mech/1.EM-lab-manuals-converted.pdf

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	1	-	-	-	-	-	1	2	3	2	2
2	3	1	2	2	1	-	-	-	-	-	1	2	2	3	2
3	3	1	2	2	3	-	-	-	-	-	1	2	3	2	2
4	3	2	3	2	1	-	-	-	-	-	1	1	3	3	2
5	3	2	2	2	2	-	-	-	-	-	1	2	3	2	3

Correlation Level: 1- Low, 2 - Medium, 3 - High

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