MEC601 **Metrology and Quality Engineering**

List of Experiments

1. Use of comparators.
2. Thread measurement.
3. Gear measurement.
4. Use of Profile projectors.
5. Use of linear and angular measuring instruments.
6. Measurement of surface roughness.
7. Measurement of flatness.

References

1. *Practical Engineering Metrology*, K.W.B.Sharp, Pitman Publication
2. *Engineering Metrology*, K.J.Hume, Kalyani publication
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MEC602 **Machine Design-I&**

References

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2. Design of machine elements -- Sharma,Purohil. Prentice Hall India Pub.
3. Machine Design - An Integrated Approach -- Robert L. Norton – PearsonEducation.
4. Machine Design - Pandya & Shah- Charotar PI/blishing.
5. Mechanical Engineering Design - J. E. Shigley - McGraw Hill
6. Recommended Data Books - PSG, K. Mahadevan
7. Machine Design - Reshetov - Mir Publication
8. Machine Design - Black Adams-Mcgraw Hill

9. Fundamentals of Machine Elements - Hawrock, Jacobson Mcgraw Hill
10. Machine Design - Patel, Pandya, Sikh, Vol. - I & II, C.
11. Jamnadas& Co. Educational & Law Publishers
12. Design of Machine Elements - V.M. Faires
13. Design of Machine Elements - Spotts.

MEC603 Mechanical Vibration

List of Experiments

1. Experimental prediction of natural frequency of compound pendulum, prediction of equivalent simple pendulum system.
2. Experimental prediction of natural frequency for longitudinal vibrations of helical springs, and springs in series and parallel
3. Experimental prediction of natural frequencies, and nodal points for single rotor and two-rotor vibratory system, and comparison with theoretical results
4. Experimental and theoretical investigation of whirling of shaft (i.e. . comparison of experimental and theoretical natural frequency and justification of discrepancy between experiment and theory)
5. Experimental investigation of viscous and coulomb damping, prediction of system parameter (spring stiffness, damping coefficient) from damped oscillations
6. Experimental and theoretical investigation of frequency response of mechanical system, and comparing both and justification of discrepancy between theory and experiments
7. Experiments' on distributed parameter system: Transverse vibrations of beam (Dunkerley's Rule Expt.)
8. Experimental balancing of single and multi-rotor system.
9. Introduction to FFT analyzer, and prediction of spectral response of vibrating machine from workshop.
10. Experiments on vibration isolation system and prediction of force transmissibility, motion transmissibility of system.
11. Vibration analysis of mechanical system using MATLAB

References

1. Mechanical Vibrations 4th ed- S. S. Rao - *Pearson Education*
2. Mechanical Vibrations - G. K. Grover
3. Fundamentals of Mechanical Vibration - S.Graham Kelly - *Tata McGraw Hill* 4.
4. Vibration Analysis - P. Srineevasan - Tata McGraw Hill
5. Mechanical Vibrations - Schaum's outline series - S.Graham Kelly- *McGraw Hill*
1. Mechanical Vibrations - Schaum's outline series - William W. Seto- *McGrmvHill* .
2. Theory and Practice of mechanical vibrations - J. S. Rao, K. Gupta - *New Age International Publications.*
3. Mechanical Vibrations - Den; Chambil, Hinckle
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8. Benson H. Tongue, Principles of Vibration. *Oxford University Press.*
9. W. Thomson, Theory of Vibrations with Applications, Second Edition, *Pearson Education*
10. Vibrations-BalakumarBalachandan, Edward Magrab, *CENGAGAE Learning.*

MEC604 **Thermal and Fluid Power Engineering**

List of Experiments

1. Study/Demonstration of Boilers
2. Study/Demonstration of Boiler mountings and accessories
3. Study of Steam Turbine
4. Trial on Impulse turbine
5. Trial on reaction turbine
6. Study of gas turbines
7. Study of Jet propulsion engines
8. Visit to Thermal Power Plant/Hydroelectric Power Plant/Gas Turbine Power Plant

References

1. Practical Boiler Operation Engineering and Power Plant, A R Mallick, 3rd ed, PHI Learning
2. Thermal Engineering, Ballaney, Khanna Publishers, Reprint 1994
3. Thermal Engineering, Kothandraman, Domkundwar, Khajuria, Arora, Dhanpatrai& Sons.
4. Turbines, Compressors & Fans, S M Yahya, TMH
5. Thermal Engineering, R K. Rajput, Laxmi Publication
6. Steam and gas turbine, R Yadav
7. Fluid Mechanics and Hydraulic Machinery, Modi and Seth, Standard Book House
8. Hydraulic Machinery, JagdishLal
9. Hydraulic Machines, Vasandani
10. Fluid Mechanics and Machinery-B C S Rao, McGraw Hill
11. Fluid Mechanics and hydraulic Machines, Gupta, Pearson Education
12. Principles of Thermodynamics, H.A. Sorensen, Amerimal Publications, 1972.
13. Applied Thermodynamics for Engineers and Technologists, Eastop and Mcconky Longman,1978
14. Hydraulic Turbines - Nechleba

MEC605 **Mechatronics**

List of Experiments

1. Study of basic principles of sensing and actuation techniques used in Mechatronics systems
2. Study of Electro-pneumatic Logic Trainer kit, and experiments on Electro-pneumatic circuits
3. Study of Electro-hydraulic Logic Trainer kit, and experiments on Electro-hydraulic circuits
4. Experiments on Ladder programming for Mechatronics system (e.g. bottle filling plant)
5. Experiments on interfacing of mechanical system
6. Experiment based on waveform generation, interfacing and control of motors etc.
7. System Identification of any one of the actuator
8. Experimental Identification by frequency response approach of Mechanical, Electrical, Chemical system
9. Development of transfer function based on experimentally identified data, Stability analysis of predicted transfer function, and PID tuning and implementation on experimental setup
10. Experimental identification of mechanisms such as flexural based systems etc.

(Design based experiments shall be encouraged using standard National Instrument/ texas instrument/ dSPACEGmbh/ Arduino or any other platform)

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2. Applied Mechatronics- A. Smaili and F. Mrad, *OXFORD university press.*
3. Mechatronics System Design , Shetty and Kolk, *Cengage Learning, India Edition*
4. Introduction to Mechatronics and Measurement Systems, Alciatore and Histand*Tata McGraw-Hill*
5. Mechatronics,Necsulescu, *Pearson education.*
6. Mechatronics - Electromechanics and Control Mechanics , Mill *Springer-Verlag*
7. Mechatronics - Electronic Control Systems in Mechanical Engineering , Bolton *Pearson eduaction*
8. Mechatronics - Electronics in products and processes , Bradley, et al. *Chapman and Hall*
9. Mechatronics - Mechanical System Interfacing , Auslander and Kempf, *Prentice Hall*
10. Introduction to Mechatronics, AppuKuttan K.K., *OXFORD Higher Education*
11. Pneumatic Circuits and Low Cost Automation: by Fawcett J.R.
12. The Art of Electronics, Horowitz and Hill Cambridge, *University Press*
13. Electromechanical Design Handbook , Walsh, *McGraw-Hill*
14. Electro-mechanical Engineering - An Integrated Approach , Fraser and Milne
15. Handbook of Electromechanical Product Design , Hurricks Longman, John Wiley, *Addison Wesley*
16. Principles and Applications of Electrical Engineering , Rizzoni, *Irwin Publishing*
17. Understanding Electro-Mechanical Engineering - An Introduction to Mechatronics , Kamm*IEEE*
18. Modeling and control of Dynamic Systems, Macia and Thaler, *Cengage Learning, India Edition*
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22. Vickers Manual on Hydraulics
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31. Mechatronics, *HMT*
32. *System Identification*: Theory for the User (2nd Edition) , Lennart Ljung
33. Design with Microprocessors for Mechanical Engineers*,* Stiffler*McGraw-Hill*

MEC606 **Finite Element Analysis**

References

1. Seshu. P. "Textbook of Finite Element Analysis" Prentice Hall of India, 2003.
2. J.N. Reddy, "Finite Element Method" Tata McGraw Hill, 2003.
3. Chandrupatla and Belegundu, "Introduction to Finite Elements in Engineering" PHI / Pearson Education, 2003.
4. Logan. D.L. "A first course in Finite Element Method", Thomson Asia Pvt. Ltd., 2002.
5. Cook R.D., Malkus. D.S. Plesha, ME., "Concepts and Applications of Finite Element Analysis", John – Wiley Sons 2003.
6. S.S. Rao, "The Finite Element Method in Engineering "Butter worth Heinemann, 2001.
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