VELTECH MULTI TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

(Owned by Vel Trust 1997)

(An ISO 9001: 2008 Certified Institution)

Accredited By NAAC with 'A' Grade and NBA Accredited Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to Anna University Chennai)

SYLLABUS

WEEKLY SCHEDULE

V SEMESTER 2017-18

DEPARTMENT OF MECHANICAL ENGINEERING

IV YEAR DEGREE COURSE

#42, Avadi – Vel Tech Road,
Avadi
Chennai – 600062
Telefax – 044-26841061
E-mail: emailto@veltechmultitech.org
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Vision of the Institute

Elevating Well Being of Humanity by Augmenting Human Resource Potential Through Quality Technical Education and Training

Mission of the Institute

To effectuate supremacy in technical education through articulation of research and industry practices for social relevance. To inculcate the habit of lifelong learning To exhibit professional ethics, commitment and leadership qualities

Vision of the Department

To become a centre of eminence in educating students to become triumphant mechanical engineers.

Mission of the Department

- To endue the students with the fundamentals of mechanical engineering with a passion for lifelong learning of industry practices
- To propagate lifelong learning.
- To impart the right proportion of knowledge blended with attitude and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. Preparation and Breadth: Graduates will apply their knowledge and skills, to solve the problems in the field of Mechanical Engineering occurring in industries and transportation.

2. Expertise: Graduates of the programme will find employment as Mechanical engineers in engineering and business or will be admitted for higher studies.

3. Professionalism: Graduates of the programme will solve problem with professionalism.

4. Lifelong Learning: Graduates will be taught and exposed to the emerging technologies to cope up with technological obsolescence

PROGRAM OUTCOME (POs)

Engineering Graduates will be able to:

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:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the 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 engineering practice.

9. **Individual and team work:** 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 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. **Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	**WEEK1**	**24.06.17**	**24.06.17**
2	**WEEK2**	**27.06.17**	**01.07.17**
3	**WEEK3**	**03.07.17**	**08.07.17**
4	**WEEK4**	**10.07.17**	**15.07.17**
5	**WEEK5**	**17.07.17**	**22.07.17**
6	**WEEK6**	**24.07.17**	**29.07.17**
7	**WEEK7**	**31.07.17**	**05.08.17**
8	**WEEK8**	**07.08.17**	**12.08.17**
9	**WEEK9**	**16.08.17**	**19.08.17**
10	**WEEK10**	**21.08.17**	**26.08.17**
11	**WEEK11**	**28.08.17**	**02.09.17**
12	**WEEK12**	**04.09.17**	**09.09.17**
13	**WEEK13**	**11.09.17**	**16.09.17**
14	**WEEK14**	**18.09.17**	**23.09.17**
15	**WEEK15**	**25.09.17**	**30.10.17**
16	**WEEK16**	**03.10.17**	**07.10.17**
17	**WEEK17**	**09.10.17**	**14.10.17**

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	ME6501	Computer Aided Design
2	ME6502	Heat and Mass Transfer
3	ME6503	Design of Machine Elements
4	ME6504	Metrology and Measurements
5	ME6505	Dynamics of Machines
6	GE6075	Professional Ethics in Engineering
PRACTICAL		
7	ME6511	Dynamics Laboratory
8	ME6512	Thermal Engineering Laboratory-II
9	ME6513	Metrology and Measurements Laboratory

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	Pre Model Exam	UNIT TEST IV
1	ME6501	Computer Aided Design	13.07.17 (FN)	27.07.17 (FN)	16.08.17	07.09.17 (FN)
2	ME6502	Heat and Mass Transfer	13.07.17 (AN)	27.07.17 (AN)	17.08.17	07.09.17 (AN)
3	ME6503	Design of Machine Elements	14.07.17 (FN)	28.07.17 (FN)	18.08.17	08.09.17 (FN)
4	ME6504	Metrology and Measurements	14.07.17 (AN)	28.07.17 (AN)	19.08.17	08.09.17 (AN)
5	ME6505	Dynamics of Machines	15.07.17 (FN)	29.07.17 (FN)	21.08.17	09.09.17 (FN)
6	GE6075	Professional Ethics in Engineering	15.07.17 (AN)	29.07.17 (AN)	22.08.17	09.09.17 (AN)

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	ME6501	Computer Aided Design	28.09.17
2	ME6502	Heat and Mass Transfer	04.10.17
3	ME6503	Design of Machine Elements	06.10.17
4	ME6504	Metrology and Measurements	09.10.17
5	ME6505	Dynamics of Machines	11.10.17
6	GE6075	Professional Ethics in Engineering	13.10.17

ME6501- COMPUTER AIDED DESIGN

WEEK 1

UNIT I: FUNDAMENTALS OF COMPUTER GRAPHICS

Product cycle- Design process- sequential and concurrent engineering

WEEK2

Computer aided design – CAD system architecture- Computer graphics – co-ordinate systems- 2D and 3D transformations.

WEEK 3

Homogeneous coordinates - Line drawing -Clipping- viewing transformation.

WEEK 4 UNIT TEST-I

UNIT II: GEOMETRIC MODELING

Representation of curves- Hermite curve-

WEEK 5

Bezier curve- B-spline curves-rational curves- Techniques for surface modeling

WEEK 6

Surface patch- Coons and bicubic patches- Bezier and B-spline surfaces. Solid modeling techniques- CSG and B-rep

UNIT TEST-II

WEEK 7

UNIT-III: VISUAL REALISM

Hidden – Line-Surface

WEEK 8

Solid removal algorithms – shading Colouring – computer animation

WEEK 9 PRE MODEL EXAM

WEEK 10

UNIT IV: ASSEMBLY OF PARTS

Assembly modelling – interferences of positions and orientation

WEEK 11

Tolerance analysis-mass property calculations-

WEEK 12

mechanism simulation and interference checking

UNIT TEST-IV

WEEK 13

UNIT V: CAD STANDARDS

Standards for computer graphics**-** Graphical Kernel System (GKS)-

WEEK -14

Standards for exchangeimages- Open Graphics Library (OpenGL) - Data exchange standards IGES, STEP, CALSetc. - Communication standards.

WEEK 15 -REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOKS:

1. Ibrahim Zeid “Mastering CAD CAM” Tata McGraw-Hill Publishing Co.2007

REFERENCES:

1. Chris McMahon and Jimmie Browne “CAD/CAM Principles", "Practice and Manufacturing management “ Second Edition, Pearson Education, 1999.
2. William M Neumann and Robert F.Sproul “Principles of Computer Graphics”, McGraw Hill Book Co. Singapore, 1989.
3. Donald Hearn and M. Pauline Baker “Computer Graphics”‟. Prentice Hall, Inc, 1992.
4. Foley, Wan Dam, Feiner and Hughes - "Computer graphics principles & practice" Pearson Education - 2003.

ME6502- HEAT AND MASS TRANSFER

WEEK 1 UNIT I: CONDUCTION

General Differential equation of Heat Conduction– Cartesian and Polar Coordinates – One Dimensional Steady State Heat Conduction

WEEK2 plane and Composite Systems – Conduction with Internal Heat Generation – Extended Surfaces – Unsteady Heat Conduction

WEEK 3 Lumped Analysis –Semi Infinite and Infinite Solids –Use of Heisler‟s charts

WEEK 4 UNIT TEST-I

UNIT II: CONVECTION

Free and Forced Convection - Hydrodynamic and Thermal Boundary Layer

WEEK 5

Free and Forced Convection during external flow over Plates and Cylinders

WEEK 6

Internal flow through tubes

UNIT TEST-II

WEEK 7

UNIT-III: PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGERS

Nusselt‟s theory of condensation - Regimes of Pool boiling and Flow boiling

WEEK 8

Correlations in boiling and condensation, Heat Exchanger Types - Overall Heat Transfer Coefficient Fouling Factors - Analysis – LMTD method - NTU method

WEEK 9 PRE MODEL EXAM

WEEK 10

UNIT IV: RADIATION

Black Body Radiation – Grey body radiation

WEEK 11

Shape Factor – Electrical Analogy – Radiation Shields

WEEK 12

Radiation through gases.

UNIT TEST-IV

WEEK 13

UNIT V: MASS TRANSFER

Basic Concepts – Diffusion Mass Transfer – Fick‟s Law of Diffusion – Steady state Molecular Diffusion

WEEK -14

Convective Mass Transfer – Momentum, Heat and Mass Transfer Analogy Convective Mass Transfer Correlations..

WEEK 15 -REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOKS:

1. Yunus A. Cengel, "Heat Transfer A Practical Approach", Tata McGraw Hill, 2010

REFERENCES:

1. Frank P. Incropera and David P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Wiley & Sons, 1998.
2. Venkateshan. S.P., "Heat Transfer", Ane Books, New Delhi, 2004.
3. Ghoshdastidar, P.S, "Heat Transfer", Oxford, 2004,
4. Nag, P.K., "Heat Transfer", Tata McGraw Hill, New Delhi, 2002
5. Holman, J.P., "Heat and Mass Transfer", Tata McGraw Hill, 2000
6. Ozisik, M.N., "Heat Transfer", McGraw Hill Book Co., 1994.
7. Kothandaraman, C.P., "Fundamentals of Heat and Mass Transfer", New Age International, New Delhi, 1998.

8. Yadav, R., "Heat and Mass Transfer", Central Publishing House, 1995.
9. M.Thirumaleshwar : Fundamentals of Heat and Mass Transfer, "Heat and Mass Transfer", First Edition, Dorling Kindersley, 2009

ME6503- DESIGN OF MACHINE ELEMENTS

WEEK 1

UNIT I: STEADY STRESSES AND VARIABLE STRESSES IN MACHINE MEMBERS

Introduction to the design process - factors influencing machine design, selection of materials based on mechanical properties - Preferred numbers, fits and tolerances – Direct, Bending and torsional stress equations – Impact and shock loading

WEEK2

Calculation of principle stresses for various load combinations, eccentric loading – curved beams – crane hook and „C" frame- Factor of safety - theories of failure

WEEK 3

Design based on strength and stiffness – stress concentration – Design for variable loading.

WEEK 4 UNIT TEST-I

UNIT II: SHAFTS AND COUPLINGS

Design of solid and hollow shafts based on strength

WEEK 5

Rigidity and critical speed – Keys, keyways

WEEK 6

splines - Rigid and flexible couplings.

UNIT TEST-II

WEEK 7

UNIT-III: TEMPORARY AND PERMANENT JOINTS

Threaded fastners - Bolted joints including eccentric loading

WEEK 8

Knuckle joints, Cotter joints – Welded joints, riveted joints for structures Theory of bonded joints.

WEEK 9 PRE MODEL EXAM

WEEK 10

UNIT IV: ENERGY STORING ELEMENTS AND ENGINE COMPONENTS

Various types of springs, optimization of helical springs

WEEK 11

Rubber springs - Flywheels considering stresses in rims and arms for engines

WEEK 12

punching machines Connecting Rods and crank shafts

UNIT TEST-III

WEEK 13

UNIT V: BEARINGS

Sliding contact and rolling contact bearings - Hydrodynamic journal bearings,

WEEK -14

Sommerfeld Number, Raimondi and Boyd graphs, Selection of Rolling Contact bearings

WEEK 15 -REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOK:

1. Bhandari V, "Design of Machine Elements", 3rd Edition, Tata McGraw-Hill Book Co, 2010.
2. Joseph Shigley, Charles Mischke, Richard Budynas and Keith Nisbett "Mechanical Engineering Design", 8th Edition, Tata McGraw-Hill, 2008.

REFERENCES:

1. Sundararajamoorthy T. V. Shanmugam .N, "Machine Design", Anuradha Publications, Chennai, 2003.
2. Robert C. Juvinall and Kurt M. Marshek, "Fundamentals of Machine Design", 4th Edition, Wiley, 2005

3. Alfred Hall, Halowenko, A and Laughlin, H., “Machine Design”, Tata McGraw-Hill BookCo.(Schaum‟s Outline), 2010
4. Bernard Hamrock, Steven Schmid,Bo Jacobson, “Fundamentals of Machine Elements”,2nd Edition, Tata McGraw-Hill Book Co., 2006.
5. Orthwein W, “Machine Component Design”, Jaico Publishing Co, 2003.
6. Ansel Ugural, “Mechanical Design – An Integral Approach", 1st Edition, Tata McGraw-Hill Book Co, 2003.
7. Merhyle F. Spotts, Terry E. Shoup and Lee E. Hornberger, “Design of Machine Elements” 8th Edition, Printice Hall, 2003

ME6504- METROLOGY AND MEASUREMENTS

WEEK 1 UNIT I: BASICS OF METROLOGY

Introduction to Metrology – Need – Elements – Work piece, Instruments

WEEK2

Persons – Environment – their effect on Precision and Accuracy – Errors – Errors in Measurements

WEEK 3

Types – Control – Types of standards.

WEEK 4 UNIT TEST-I

UNIT II: LINEAR AND ANGULAR MEASUREMENTS

Linear Measuring Instruments – Evolution – Types – Classification – Limit gauges – gauge design – terminology – procedure

WEEK 5

Concepts of interchange ability and selective assembly – Angular measuring instruments – Types – Bevel protractor clinometers

WEEK 6

Angle gauges, spirit levels sine bar – Angle alignment telescope – Autocollimator – Applications

UNIT TEST-II

WEEK 7

UNIT-III: ADVANCES IN METROLOGY

Basic concept of lasers Advantages of lasers – laser Interferometers – types – DC and AC Lasers interferometer – Applications – Straightness

WEEK 8

Alignment. Basic concept of CMM – Types of CMM – Constructional features – Probes – Accessories – Software Applications – Basic concepts of Machine Vision System – Element – Applications

WEEK 9 PRE MODEL EXAM

WEEK 10

UNIT IV: FORM MEASUREMENT

Principles and Methods of straightness – Flatness measurement

WEEK 11

Thread measurement, gear measurement,

WEEK 12

surface finish measurement Roundness measurement – Applications

UNIT TEST-IV

WEEK 13

UNIT V: MEASUREMENT OF POWER, FLOW AND TEMPERATURE

Force, torque, power - mechanical , Pneumatic, Hydraulic and Electrical type. Flow measurement: Venturimeter, Orifice meter, rotameter, pitot tube

WEEK -14

Temperature: bimetallic strip, thermocouples, electrical resistance thermometer Reliability and Calibration – Readability and Reliability

WEEK 15 -REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOKS:

1. Jain R.K. “Engineering Metrology”, Khanna Publishers, 2005.
2. Gupta. I.C., “Engineering Metrology”, Dhanpatrai Publications, 2005.

REFERENCES:

1. Charles Reginald Shotbolt, "Metrology for Engineers", 5th edition, Cengage Learning EMEA,1990.
2. Backwith, Marangoni, Lienhard, "Mechanical Measurements", Pearson Education , 2006.

ME6505 DYNAMICS OF MACHINES

WEEK 1

UNIT I: FORCE ANALYSIS

Dynamic force analysis – Inertia force and Inertia torque– D Alembert‟s principle –Dynamic Analysis in reciprocating engines

WEEK2

Gas forces – Inertia effect of connecting rod– Bearing loads – Crank shaft torque – Turning moment diagrams

WEEK 3

Fly Wheels – Flywheels of punching presses- Dynamics of Cam-follower mechanism.

WEEK 4 UNIT TEST-I

UNIT II: BALANCING

Static and dynamic balancing – Balancing of rotating masses – Balancing a single cylinder engine

WEEK 5

Balancing of Multi-cylinder inline, V-engines – Partial balancing in engines – Balancing of linkages

WEEK 6

Balancing machines-Field balancing of discs and rotors.

UNIT TEST-II

WEEK 7

UNIT-III: SINGLE DEGREE FREE VIBRATION

Basic features of vibratory systems – Degrees of freedom – single degree of freedom – Free vibration – Equations of motion

WEEK 8

Natural frequency – Types of Damping – Damped vibration– Torsional vibration of shaft – Critical speeds of shafts Torsional vibration – Two and three rotor torsional systems..

WEEK 9 PRE MODEL EXAM
WEEK 10
UNIT IV: FORCED VIBRATION
Response of one degree freedom systems to periodic forcing
WEEK 11
Harmonic disturbances –Disturbance caused by unbalance – Support motion –
WEEK 12
transmissibility Vibration isolation vibration measurement
UNIT TEST-IV
WEEK 13
UNIT V: MECHANISM FOR CONTROL
Governors – Types – Centrifugal governors – Gravity controlled and spring controlled centrifugal governors – Characteristics – Effect of friction
WEEK -14
Controlling force curves. Gyroscopes –Gyroscopic forces and torques – Gyroscopic stabilization Gyroscopic effects in Automobiles, ships and airplanes
WEEK 15 -REVISION CLASS
WEEK-16 – MODEL EXAM
WEEK-17- MODEL EXAM

TEXT BOOK:

1. Uicker, J.J., Pennock G.R and Shigley, J.E., "Theory of Machines and Mechanisms" ,3rd Edition, Oxford University Press, 2009.
2. Rattan, S.S, "Theory of Machines", 3rd Edition, Tata McGraw-Hill, 2009

REFERENCES:

1. Thomas Bevan, "Theory of Machines", 3rd Edition, CBS Publishers and Distributors, 2005.
2. Cleghorn. W. L, "Mechanisms of Machines", Oxford University Press, 2005

3. Benson H. Tongue, ”Principles of Vibrations”, Oxford University Press, 2nd Edition, 2007
4. Robert L. Norton, "Kinematics and Dynamics of Machinery", Tata McGraw-Hill, 2009.
5. Allen S. Hall Jr., “Kinematics and Linkage Design”, Prentice Hall, 1961
6. Ghosh. A and Mallick, A.K., “Theory of Mechanisms and Machines", Affiliated East-West Pvt. Ltd., New Delhi, 1988.
7. Rao.J.S. and Dukkipati.R.V. "Mechanisms and Machine Theory", Wiley-Eastern Ltd., New Delhi, 1992.
8. John Hannah and Stephens R.C., "Mechanics of Machines", Viva Low-Prices Student Edition, 1999.
9. Grover. G.T., “Mechanical Vibrations”, Nem Chand and Bros., 1996
10. William T. Thomson, Marie Dillon Dahleh, Chandramouli Padmanabhan, “Theory of Vibration with Application”, 5th edition, Pearson Education, 2011
11. V.Ramamurthi, "Mechanics of Machines", Narosa Publishing House, 2002.
12. Khurmi, R.S.,”Theory of Machines”, 14th Edition, S Chand Publications, 2005.

GE6075 PROFESSIONAL ETHICS IN ENGINEERING

WEEK 1

UNIT I: HUMAN VALUES

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing

WEEK2

Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character

WEEK 3

Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

WEEK 4 UNIT TEST-I

UNIT II: ENGINEERING ETHICS

Senses of „Engineering Ethics‟ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy

WEEK 5

Kohlberg‟s theory – Gilligan‟s theory – Consensus and Controversy – Models of professional roles - Theories about right action

WEEK 6

Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT TEST-II

WEEK 7

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as Experimentation – Engineers as responsible Experimenters

WEEK 8

Codes of Ethics ,A Balanced Outlook on Law.

WEEK 9 PRE MODEL EXAM

WEEK 10

UNIT IV: SAFETY, RESPONSIBILITIES AND RIGHTS

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority

WEEK 11

Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights

WEEK 12

Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT TEST-IV

WEEK 13

UNIT V: GLOBAL ISSUES

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers

WEEK -14

Consulting Engineers – Engineers as Expert Witnesses and Advisors Moral Leadership –Code of Conduct – Corporate Social Responsibility

WEEK 15 -REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXTBOOKS:

1. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Cengage Learning, 2009
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, “Fundametals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001
5. Laura P. Hartman and Joe Desjardins, “Business Ethics: Decision Making for Personal Integrity and Social Responsibility” Mc Graw Hill education, India Pvt. Ltd.,New Delhi 2013.
6. World Community Service Centre, " Value Education", Vethathiri publications, Erode, 2011

ME6511 DYNAMICS LABORATORY

LIST OF EXPERIMENTS

1. a) Study of gear parameters.
b) Experimental study of velocity ratios of simple, compound, Epicyclic and differential gear trains.
2. a) Kinematics of Four Bar, Slider Crank, Crank Rocker, Double crank, Double rocker, Oscillating cylinder Mechanisms.
b) Kinematics of single and double universal joints.

3. a) Determination of Mass moment of inertia of Fly wheel and Axle system.

b) Determination of Mass Moment of Inertia of axisymmetric bodies using Turn Table apparatus.

c) Determination of Mass Moment of Inertia using bifilar suspension and compound pendulum.

4. Motorized gyroscope – Study of gyroscopic effect and couple.

5. Governor - Determination of range sensitivity, effort etc., for Watts, Porter, Proell, and Hartnell Governors.

6. Cams – Cam profile drawing, Motion curves and study of jump phenomenon

7. a) Single degree of freedom Spring Mass System – Determination of natural Frequency and verification of Laws of springs – Damping coefficient determination.

b) Multi degree freedom suspension system – Determination of influence coefficient.

8. a) Determination of torsional natural frequency of single and Double Rotor systems.- Undamped and Damped Natural frequencies.

b) Vibration Absorber – Tuned vibration absorber.

9. Vibration of Equivalent Spring mass system – undamped and damped vibration.

10. Whirling of shafts – Determination of critical speeds of shafts with concentrated loads.

11. a) Balancing of rotating masses.

(b) Balancing of reciprocating masses.

12. a) Transverse vibration of Free-Free beam – with and without concentrated masses.

b) Forced Vibration of Cantilever beam – Mode shapes and natural frequencies.

c) Determination of transmissibility ratio using vibrating table.

ME6512 THERMAL ENGINEERING LABORATORY – II

LIST OF EXPERIMENTS:

HEAT TRANSFER LAB:

1. Thermal conductivity measurement using guarded plate apparatus.
2. Thermal conductivity measurement of pipe insulation using lagged pipe apparatus.

3. Determination of heat transfer coefficient under natural convection from a vertical cylinder.
4. Determination of heat transfer coefficient under forced convection from a tube.
5. Determination of Thermal conductivity of composite wall.
6. Determination of Thermal conductivity of insulating powder.
7. Heat transfer from pin-fin apparatus (natural & forced convection modes)
8. Determination of Stefan – Boltzmann constant.
9. Determination of emissivity of a grey surface.
10. Effectiveness of Parallel / counter flow heat exchanger.

REFRIGERATION AND AIR CONDITIONING LAB

1. Determination of COP of a refrigeration system
2. Experiments on Psychrometric processes
3. Performance test on a reciprocating air compressor
4. Performance test in a HC Refrigeration System
5. Performance test in a fluidized Bed Cooling Tower

ME6513 METROLOGY AND MEASUREMENTS LABORATORY

LIST OF EXPERIMENTS

1. Tool Maker‟s Microscope
2. Comparator
3. Sine Bar
4. Gear Tooth Vernier Caliper
5. Floating gauge Micrometer
6. Co ordinate Measuring Machine
7. Surface Finish Measuring Equipment
8. Vernier Height Gauge
9. Bore diameter measurement using telescope gauge
10. Bore diameter measurement using micrometer
11. Force Measurement
12. Torque Measurement
13. Temperature measurement
14. Autocollimator

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