

SEMESTER- III

CODE	COURSE OF STUDY	L	T	P	C
MA211	Mathematics -III	3	0	0	3
EE223	Applied Electrical Engineering	2	0	2	3
EC217	Applied Electronics Engineering	2	0	2	3
ME201	Production Technology - I	3	1	0	4
ME203	Strength of Materials	3	0	0	3
ME205	Engineering Thermodynamics	3	1	0	4
ME207	Machine Drawing	0	0	3	2
Practical					
ME209	Strength of Materials Lab	0	0	3	2
ME211	Production Process Lab -I	0	0	3	2
	Total	16	2	13	26

SEMESTER III

MA211 Mathematics– III

UNIT-I

Special functions: Gamma and Beta Functions – Their properties – evaluation of improper integrals. Bessel functions – properties – Recurrence relations – Orthogonality. Legendre polynomials – Properties – Rodrigue’s formula – Recurrence relations – Orthogonality.

UNIT-II

Complex Variables: Analytic function - Cauchy Riemann equations - Harmonic functions - Conjugate functions - complex integration - line integrals in complex plane - Cauchy’s theorem (without proof), Cauchy’s integral formula.

UNIT-III

Taylor’s and Laurent’s series expansions - zeros and singularities - Residues - residue theorem, evaluation of real integrals using residue theorem, Bilinear transformations, conformal mapping.

UNIT-IV

Probability and Statistics: Probability laws – Addition and Multiplication theorems on probability - Baye’s theorem –Expectation, Moments and Moment generating function of Discrete and continuous distributions, Binomial, Poisson and Normal distributions, fitting these distributions to the given data.

UNIT-V

Testing of Hypothesis: Z-test for single mean and difference of means, single proportion and difference of proportions - t-test for single mean and difference of means, F-test for comparison of variances. Chi-square test for goodness of fit.–Correlation, regression.

Text Books

- 1.Grewal,B.S., Higher Engineering Mathematics, Khanna Publishers.
- 2.Gupta, S.C., and Kapoor, V.K., Fundamentals of Mathematical Statistics, Sultan Chand and Sons.

Reference Books

1.Venkataraman, M. K., Higher Mathematics for Engineering and Science, National Publishing Company.

EE223 Applied Electrical Engineering

UNIT – I

Transformers: EMF Equation – Equivalent circuit – Voltage regulation - OC and SC Test – Efficiency – condition for maximum efficiency – All day efficiency – Autotransformer – introduction to three phase Transformer. AC Machines: Theory and operation of 3 phase Induction motor - constructional details – starting methods – speed control methods – principle of operation of single – phase Induction motor – stepper motor – AC series motor – Applications.

UNIT – II

DC Generator – construction, principle of operation, types of DC generators, Characteristics of DC generator, application of DC generators, DC motor – principle of operation, back EMF, importance of back EMF, types – voltage equation of DC motors, types of DC motors, speed control of DC motors, testing of DC machines application of DC motors

UNIT – III

Alternators: Alternators - construction - Operating principle - alternators on No load – Alternators on Load - Phasor diagram - voltage regulation – Losses – Efficiency – Parallel operation of alternators. Selection of Drives: Electric drives – Individual and Group drives – Factors governing selection of drives – Motors for domestic uses. Cranes, Lifts, General Factory, Textile Mill, Paper Mill, Mining Work, Cement Mill, Machine Tools, Belt Conveyors, Ships, Refrigeration and Air Conditioning.

UNIT-IV

Transmission of electrical power - Transmission line parameters – resistance, inductance and capacitance calculations - single phase and three phase lines - Mechanical design of overhead

lines – line supports – insulators - voltage distribution in suspension insulators – string efficiency
- testing of insulators stress and sag calculation – effects of wind and ice loading.

UNIT-V

Illumination - Luminous Flux, Lumen- Illuminance, lux Luminous intensity, Candela – Luminance, Candela/m². Inverse square law and Cosine law of illumination (Illuminance) - Calculation- Application of inverse square law and Cosine law- Matt surfaces- Lumen method of lighting design – utilization factor, light loss factor, Glare and glare index- Light sources- and types of lamps-basic parameters and terminologies used in lighting system – Illuminance standards and its calculation – Lighting controls and labelling - Choice of lighting equipment- lighting system management.

Text Books

1. Theraja, B.L., Electrical Technology, Vol – 2, S. Chand & Company, 1997.
2. Gupta, J.B., A Course in Electrical Power, S.K. Kataria & Sons, 1997.
3. Wadhawa, C.L. Electrical Power Systems, New Age International Publishers, 6th edition, 2009
4. D. P. Kothari and I.J Nagrath, Power System Engineering, Tata Mcgraw – Hill, 2nd edition, 2008
5. Illumination Engineering, J. B. Murdoch.

Reference Books

1. Hughes, E., Electrical Technology, E.L.B.S. 1996.
2. Partab, H., Art & Science of utilization of Electrical Energy, DhanpatRai& Sons, 1997.
3. Gupta B.R., ' Power system Analysis & Design', S. Chand and Company Ltd., 2nd edition, 2008

List of Experiments on Applied Electrical Engineering

1. Load Test on DC Shunt Motor
2. Speed control of DC Shunt Motor
3. Load test on DC Series Motor
4. Open Circuit test and Load test on dc shunt generator

5. Load test on single phase transformer
6. Load test on three phase induction motor
7. Speed control of three phase induction motor using rotor resistance variation method
8. Load test on three phase synchronous generator

EC217 Applied Electronics Engineering

UNIT -I

Power Semiconductor Devices – Power diodes -power transistors-SCRs-Triac-GTO-Power MOSFETs-IGBTs-Principles of operation and characteristics, ratings, protection and gate drive circuits – AC to DC conversion – DC to DC conversion – DC to AC conversion – AC to AC conversion.

UNIT-II

Amplifier circuits – R.C. Coupled, Transformer Coupled, Direct Coupled; Differential amplifiers, Concept of negative feed-back; Feed-back amplifiers.

UNIT-III

Applications of operational amplifiers. Inverting and non-inverting amplifiers, Differentiator – Multiplier - Divider, Comparator – VI and IV converter. Oscillator –Principle – types,

UNIT-IV

Digital Circuits – Multiplexers, Demultiplexers, Decoder and Encoders., D/A and A/D – Types; Sample and Hold circuit

UNIT-V

Microprocessor – 8085 Architecture, Interfacing, System design, Overview of MEMS and Microsystems, Materials, Fabrication Processes and Micro System Packaging

Text Books:

1. Sedra, A.S. and Smith, K.C., Micro Electronic Circuits, Oxford University Press, 2004.
2. Millman and Halkias, Integrated Electronics, Tata McGraw -Hill, 1998.

3. Ramesh Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition
4. Tai – Ran Hsu, MEMS and Microsystems Design and Manufacture, Tata-McGraw Hill, New Delhi, 2002.
5. Rashid, M.H. ,'Power Electronics - circuits, devices and applications', Prentice Hall India, New Delhi, 2006.

Reference Books:

1. Donald A. Neamen, Electronic Circuit Analysis and Design, Tata McGraw- Hill, 2002.
2. M.D.singh and K.B.Khanchandani, "Power Electronics", Tata Mc Graw Hills Publishing Company Limited, New Delhi 2006.

List of Experiments in Applied Electronics Engineering

1. Characterization of semiconductor devices
(a) PN Junction diode (b) LED (c) Zener diode (d) SCR
2. Half wave and full wave rectifier
3. Characteristics of a Transistor
4. OPAMP- Applications
5. (a) Multiplexer- Demultiplexer
6. Encoder- decoder
7. Analog to Digital and Digital to Analog converters
8. Introduction to 8085 Microprocessor

ME201 Production Technology – I

UNIT-I

Moulding sands - Types and Properties, patterns - types of patterns, selection of patterns -pattern allowances - Classifications of castings - according to mould materials and moulding methods. Special casting techniques - Fettling and finishing of castings - defects in castings.

UNIT-II

Classification of welding process: Principle of Gas welding, Arc welding, resistance welding, Solid State Welding, Thermochemical welding and radiant energy welding -Brazing and soldering - thermal cutting of metal/alloys.

UNIT-III

Forging: Classification of forging processes - forging processes - forging defects and inspection. Rolling: Classification of rolling processes - rolling mill - rolling of bars and shapes. Extrusion: Classification of extrusion processes - extrusion equipments - examples. Drawing: Drawing of rods, wires and tubes. Sheet metal forming methods: Shearing, Blanking, Bending, Stretch Forming, deep forming. Spinning: Spinning processes.

UNIT-IV

High Velocity Forming: Explosive forming, Electro hydraulic forming - magnetic pulse forming - pneumatic - mechanical high velocity forming. Plastics Working: Types of plastics - plastic moulding processes.

UNIT-V

Introduction to non –conventional machining– EDM, ECM, ECG, AJM and USM. Jigs and Fixtures – concepts of jigs and fixtures – advantages – elements of jigs and fixtures – ‘v’ locators – fixed stop locators – adjustable stop locators – clamping devices – strap clamp, screw clamp – cam action clamps – types of jigs – box drill jig – indexing drill jig – types of fixtures –keyway and string milling fixtures.

Text Books:

1. Jain R.K., Production Technology, Khanna Publishers, 2001.
2. Hajra Choudhry, Elements of Workshop Technology, Vol – II Media Promoters & Publishers, 1994.
3. Kalpakjian. S, “Manufacturing Engineering and Technology”, Pearson Education India Edition, 2006

Reference Books:

1. Production Technology by HMT, Tata McGraw-Hill, 2002.
2. Chapman, W.A.J., Workshop Technology, Vol - II, Oxford & IBH Publishing Co. Ltd., 1986.
3. Gowri P. Hariharan, A.Suresh Babu, "Manufacturing Technology I", Pearson Education, 2008
4. Roy. A. Lindberg, "Processes and Materials of Manufacture", PHI / Pearson education, 2006
5. Paul Degarma E, Black J.T and Ronald A. Kosher, "Materials and Processes in Manufacturing" Eight Editions, Prentice – Hall of India, 1997.
6. Sharma, P.C., "A Text book of production Technology", S.Chand and Co. Ltd., 2004.
7. Rao, P.N. "Manufacturing Technology Foundry, Forming and Welding", 2ndEdition, TMH-2003

ME203 Strength of Materials

UNIT-I

Simple Stresses and Strain – Relation between three modulus and Poisson’s ratio – Thermal Stress – Principal stress and Principal planes - Shear Force – Bending Moment – Cantilever and simply supported beams subjected to point loads and uniformly distributed loads.

UNIT-II

Theory of simple bending - stress variation in beam cross Section; Normal and Shear stress in Beams – Beam of uniform strength for bending, combined direct and bending stresses.

UNIT-III

Double integration method – moment area method – Introduction to strain energy method and Principle of virtual work.

UNIT-IV

Torsion of circular solid and hollow shafts – Shafts in Series and parallel – Combined bending and torsion -Application of Torsion in helical springs: Open and closed coil springs, Leaf Springs.

UNIT-V

Euler's Equation – short and long column, Empirical formulae: Johnson – Rankine. Introduction to thin cylinder – Thick cylinder – Lamé's Equation – Compound Cylinders – Interference fit.

Text Books:

1. Timoshenko, S.P., Gere, M.J., Mechanics of Materials, C.B.S., Publishers, 1980.
2. Ramamurtham, S., Strength of Materials,,DhanpatRai Publications, 2005.
3. Bansal, R.K., "Strength of Materials", Laxmi Publications (P) Ltd., 2007
4. Jindal U.C., "Strength of Materials", Asian Books Pvt. Ltd., New Delhi, 2007
- 5.R.K.Rajput, Strength of Materials, S.Chand Publication, New Delhi

Reference Book:

1. Egor. P.Popov "Engineering Mechanics of Solids" Prentice Hall of India, New Delhi, 2007.
2. Subramanian R., "Strength of Materials", Oxford University Press, Oxford Higher Education Series,
3. Hibbeler, R.C., "Mechanics of Materials", Pearson Education, Low Price Edition, 2007
4. Ferdinand P. Beer, Russell Johnson, J.R. and John J. Dewole "Mechanics of Materials", TataMcGraw Hill Publishing 'co. Ltd., New Delhi, 2005.

ME205 Engineering Thermodynamics

UNIT-I

Review of basic concepts of thermodynamics, properties of pure substances - First law applied to control mass, control volumes. First law of thermodynamics steady flow energy equation - applications of SFEE - uniform state, uniform flow.

UNIT-II

Second law statements - irreversible processes, Carnot theorem, Clausius Inequality - entropy, entropy change for pure substances – T-S diagram, entropy change applied to control mass, control volume-availability and irreversibility.

UNIT-III

Vapour power cycles - Rankine cycle - Effect of pressure and temperature on Rankine cycle - Reheat cycle - Regenerative cycle – Binary vapour cycles - Air standard power cycles - Assumptions - Otto , Diesel , dual , Stirling and Brayton cycles.

UNIT-IV

Thermodynamic relations: Partial derivatives - Maxwell relations - Clapeyron equation, entropy of a pure substance - entropy change of an ideal gas - the ideal gas - Behavior of real gases - equations of state. Isothermal and adiabatic compressibility.

UNIT-V

Mixture of non-reacting gases - Dalton's and Amalgam's model - calculation of C_p , C_v , R and U , h and s changes for gas mixtures fuels and combustion - combustion chemistry -calculation of air fuel ratio - exhaust gas analysis.

Text Books:

1. Sonntag, R.E., Borgnakke, C., and Van Wylen, G.J., Fundamentals of Thermodynamics, 6th ed., John Wiley, 2003.
2. Cengel, Y.A and Boles, M.A, Thermodynamics: An Engineering Approach, 5th ed.,McGraw-Hill, 2006.

Reference Books:

1. Nag.P.K., "Engineering Thermodynamics", 4th Edition, Tata McGraw-Hill, New Delhi, 2008.
2. Natarajan E., "Engineering Thermodynamics: Fundamentals and Applications", Anuragam Publications, 2012.
3. Holman.J.P., "Thermodynamics", 3rd Edition, McGraw-Hill, 1995.
4. Rathakrishnan. E., "Fundamentals of Engineering Thermodynamics", 2nd Edition, Prentice-Hall of India Pvt. Ltd, 2006
5. Chattopadhyay, P, "Engineering Thermodynamics", Oxford University Press, 2010.
6. Arora C.P, "Thermodynamics", Tata McGraw-Hill, New Delhi, 2003.
7. Van Wylen and Sonntag, "Classical Thermodynamics", Wiley Eastern, 1987
8. Venkatesh. A, "Basic Engineering Thermodynamics", Universities Press (India) Limited, 2007.
9. Kau-Fui Vincent Wong, "Thermodynamics for Engineers", CRC Press, 2010 Indian Reprint.
10. Prasanna Kumar: Thermodynamics "Engineering Thermodynamics" Pearson Education, 2013

ME207 Machine Drawing**UNIT-I**

Standardization - Interchangeability - Selective Assembly - Tolerance. Tolerance of form and position - grades of tolerance - fits .

UNIT-II

Standard tolerances - Machining symbols – surface finish indication - Functional and manufacturing datum.

UNIT-III

Shaft Couplings: rigid, flexible: cotter joints, knuckle joints, Hook's joints. Bearings -Journal - Footstep, thrust or Collar bearing.

UNIT-IV

Plummer block; Pulleys for flat belts, V-belt and rope. Engine parts - Stuffing box, Connecting rod, Atomizer, spark plug, fuel injection pump. Valves - stop valve - safety valve, relief valve and non-return valve.

UNIT-V

Machine tool components - Drill jig, Tail stock, Toolpost, Tool head for shaping machine, machine vice, screw jack.

Text Books:

1. Dhawan, R.K., A Text Book of Machine Drawing, S. Chand & Company, 1996.
2. Ostrowsky, O., Engineering Drawing with CAD Applications, ELBS, 1995.
3. Bhatt, N.D “Machine Drawing”, Charotar Publishing House.2008
4. Gopalakrishnan, K.R, “Machine Drawing”, SUBHAS Publications, VIII edition, 2004

Reference Books:

1. Engineering Drawing Practice for Schools and Colleges SP: 46- 1988.
2. Gupta, R.B, “Machine Drawing”, Satya Prakasham, 1998
3. Sidheswar, “Machine Drawing” Tata Mc Graw Hill edition, 2006
4. Sadhu Singh and P.L. Sah, Fundamentals of Machine Drawing, PHI 2005

ME209 Strength of Materials Lab

1. Deflection test on wooden beams.
2. Torsion test on different grades of steel.
3. Tensile and Compression test
4. Hardness test.
5. Impact test.
6. Ductility test

ME211 Production Process Lab - I

1. Study of Lathe
2. Plain turning and facing
3. Step turning, Grooving & Chamfering
4. Taper turning by swiveling compound rest method
5. Taper turning by attachment method
6. V – Thread cutting
7. Knurling
7. CNC Lathe – Simple Turning, Step Turning, Thread Turning