Madhyanchal Professional University, MP B.E./B.Tech CIVIL Sem 2 syllabus

Basics of Electrical and Electronics

Unit- I :
D.C. Circuits: Voltage and current sources, dependent and independent sources, Units and dimensions,
Source Conversion, Ohm's Law, Kirchhoff's Law, Superposition theorem, Thevenin's theorem and their
application for analysis of series and parallel resistive circuits excited by independent voltage sources,
Power
& Energy in such circuits. Mesh & nodal analysis, Star Delta transformation & circuits.
Unit – II :
1- phase AC Circuits: Generation of sinusoidal AC voltage, definition of average value, R.M.S. value,
form factor and peak factor of AC quantity , Concept of phasor, Concept of Power factor, Concept of
impedance and admittance, Active, reactive and apparent power, analysis of R-L, R-C, R-L-C series &
parallel circuit
3-phase AC Circuits: Necessity and advantages of three phase systems, Meaning of Phase sequence,
balanced and unbalanced supply and loads. Relationship between line and phase values for balanced star
and delta connections. Power in balanced & unbalanced three-phase system and their measurements
Unit – III : Magnetic Circuits: Basic definitions, magnetization characteristics of Ferro magnetic
materials, self inductance and mutual inductance, energy in linear magnetic systems, coils connected in
series, AC excitation in magnetic circuits, magnetic field produced by current carrying conductor, Force on
a current carrying conductor. Induced voltage, laws of

electromagnetic Induction, direction of induced
E.M.F.
Single phase transformer- General construction, working principle, e.m.f. equation, equivalent
circuits, phasor diagram, voltage regulation, losses and efficiency, open circuit and short circuit test

Unit IV:

Electrical Machines: Construction, Classification & Working Principle of DC machine, induction machine
and synchronous machine. Working principle of 3-Phase induction motor, Concept of slip in 3- Phase
induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor. Types of losses
occurring in electrical machines. Applications of DC machine, induction machine and synchronous
machine.

Unit V :

Basic Electronics: Number systems & Their conversion used in digital electronics, De morgan's theorem,
Logic Gates, half and full adder circuits, R-S flip flop, J-K flip flop. Introduction to Semiconductors,
Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB &
CE transistor configurations, different configurations and modes of operation of BJT

Mathematics-2

Module 1: Ordinary Differential Equations I :(6 hours) : Differential Equations of First Order and First
Degree (Leibnitz linear, Bernoulli's, Exact), Differential Equations of First Order and Higher Degree, Higher
order differential equations with constants coefficients, Homogeneous Linear Differential equations,
Simultaneous Differential Equations.

Module 2: Ordinary differential Equations II:(8 hours) :Second order linear differential equations with
variable coefficients, Method of variation of parameters, Power series solutions; Legendre polynomials,
Bessel functions of the first kind and their properties.

Module 3: Partial Differential Equations : (8 hours) : Formulation of Partial Differential equations,
Linear and Non-Linear Partial Differential Equations, Homogeneous Linear Partial Differential Equations
with Constants Coefficients.

Module 4: Functions of Complex Variable :(8 hours) : Functions of Complex Variables: Analytic
Functions, Harmonic Conjugate, Cauchy-Riemann Equations (without proof), Line Integral, Cauchy-Goursat
theorem (without proof), Cauchy Integral formula (without proof), Singular Points, Poles & Residues,
Residue Theorem, Application of Residues theorem for Evaluation of Real Integral (Unit Circle).

Module 5: Vector Calculus : (10 hours) : Differentiation of Vectors, Scalar and vector point function,
Gradient, Geometrical meaning of gradient, Directional Derivative, Divergence and Curl, Line Integral,
Surface Integral and Volume Integral, Gauss Divergence, Stokes and Green theorems.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,
Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th
Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill,
2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering

Mathematics, Laxmi
Publications, Reprint, 2008.
9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

English for Communication

Unit-I

Identifying Common errors in writing: Articles, Subject-Verb Agreement, Prepositions, Active and
Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure.

Unit-II

Vocabulary building and Comprehension:
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, synonyms,
antonyms, Reading comprehension.

Unit-III

Communication:
Introduction, Meaning and Significance, Process of Communication, Oral and Written Communication, 7 c's
of Communication, Barriers to Communication and Ways to overcome them, Importance of Communication
for Technical students, nonverbal communication.

Unit-IV

Developing Writing Skills:
Planning, Drafting and Editing, Precise Writing, Précis, Technical definition and Technical description.
Report Writing: Features of writing a good Report, Structure of a Formal Report, Report of Trouble,
Laboratory Report, Progress Report.

Unit-V

Business Correspondence:
Importance of Business Letters, Parts and Layout; Application, Contents of good Resume, guidelines for
writing Resume, Calling/ Sending Quotation, Order, Complaint, E-mail and Tender.