# Integral University Lucknow
## Study & Evaluation Scheme
### B. Tech. (Electrical Engg.)

#### 2nd YEAR

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Subject total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>1.</td>
<td>IEE-301</td>
<td>Linear Network &amp; System</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>IEE-302</td>
<td>Electro Mechanical Energy Conversion-I</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>IEE-303</td>
<td>Electrical Measurements &amp; Measuring Instruments</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>IEC-301</td>
<td>Electronics Device &amp; Circuit</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5.</td>
<td>IMA-301</td>
<td>Mathematics</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6.</td>
<td>IHU-301/ICS-305</td>
<td>Disaster management/ cyber Law &amp; Information Security</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7.</td>
<td>IHU-303</td>
<td>• Human Values and Professional Ethics</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Practical/Training/Project

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Subject total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>IEE-351</td>
<td>Networks Lab</td>
<td>-</td>
<td>03 10 10 20 30 50</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>IEE-352</td>
<td>EMEC-I Lab</td>
<td>-</td>
<td>03 10 10 20 30 50</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>IEE-353</td>
<td>EMMI Lab</td>
<td>-</td>
<td>03 10 10 20 30 50</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>IEC-351</td>
<td>Electronics Circuit Lab</td>
<td>-</td>
<td>03 10 10 20 30 50</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>GP-301</td>
<td>General Proficiency</td>
<td>-</td>
<td>- - - - - - 50 - 50</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>17 06 12 180 175 405 695 1100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Audit Course(IHU-303) : This is compulsory audit course in which a student must to be clear this paper with 50% passing marks up to the final year and marks will not be included in result.
IEE 301 –Linear Network and Systems

Unit-I

Kirchoff’s law, Source transformation, loops variable analysis, node variable analysis and duality.

AC Network theorems: Superposition, Thvenin’s, Norton’s, Millman, Telegen’s and maximum power transfer theorems.

Introduction to continuous time singles and system, Basic continuous time signals, unit, ramp, impulse and gate function. (8)

Unit-II

Transient and steady state analysis for R-L, R-C, RLC circuits, Use of Laplace transform, Initial value and final theorem, Solution of differential equations using laplace transform Laplace transform of complex waveforms, and waveform synthesis. Formulation for linear time invariant (LTI) continuous time systems, Time Domain analysis of LTI system using laplace transforms (transient and steady State). (10)

Unit-III

Concept of poles and zeros, Stability, Frequency response Positive real function: Definitions and properties, Synthesis of RC, LC and Networks using Cauer’s and Foster’s First and second form. (7)

Unit-IV

Two port networks, two port parameters, Inter-Conversion of two port Parameters, Network Functions: Driving point and transfer function Interconnections of Two port networks, Recipe Dance, and Symmetry, Ladder Networks, Image impedances, Characteristic impedance, T-pie transformation. (8)

Unit-V

Introduction to graph theory, Definitions, Graphs, Three, Walk, Path, Loop, Co- tree, Cut-set matrices for planer network, loop and nodal analysis. (7)

References:
1. M.E.Van Valkenburg, Network Analysis, PHI
2. J.A.Edminister, Electric Circuits, Schaum Series, PHI
4. A.Hussain, Network and Systems, Khanna publications
UNIT-I

Principle of EMEC
Introduction, Energy in electromagnetic system, Flow of energy in electromechanical devices, Energy in magnetic field and co-energy, Dynamics of electromechanical systems, singly excited systems, Doubly Excited. System, Force and torques in systems with permanent magnets. (8)

UNIT-II

D.C. Machines
Construction Features, EMF and Torque equations, Armature windings, Armature Reaction, Demagnetizing and cross magnetizing M.M.F., Interpole and compensating windings, Commutation, characteristics of D.C. generator. (8)

UNIT-III


UNIT-IV

Transformers
Review of single phase transformers, Transformer constructions and practical considerations, Equivalent circuit, Phasor diagram, Transformer testing, Efficiency and voltage regulation, All day efficiency, per unit values, Autotransformer. (8)

UNIT-V

Three phase transformers connection, 3 to 6 phase conversion, Scott connection, Parallel operation of transformer, Three winding transformer, Tap changing transformer for special purposes. (8)

References:
1. Electric machines, M.A.Mallick, IK International Pvt. Ltd New Delhi
2. Electrical Machinery, Fitzgerald, Kingsley (McGraw Hill)
3. Electrical Machines and their applications, J Hind Marsh
4. Fundamental of electrical Machines, B.R. Gupta & V. Singhal (New Age International Pub.)
5. Eletric Machinery and transformers, I.L.Kosow, PHI
6. Electrical Machine, I J Nagrath and D P Kothari (TMH)
Unit I:
Philosophy of measurement: Methods of measurement, measurement system, classification of instrument system, characteristics of instrument and measurement system, error in measurement and its analysis.
Analog measurement of electrical quantities: PMMC type Instruments, Moving Iron type Instruments, Electrodynamics type Instruments’ three phase wattmeter, error and remedies in wattmeter.

Unit II:
Power measurements in three phase system, Thermocouple, electrostatic and rectified type ammeter and voltmeter, Energy meter, error and remedies in energy meter.
Instrument transformer and their application in the extension of instruments range.

Unit III:
Measurement of parameter: Different methods of measurement of low, medium and high resistances, measurement of inductance and capacitance with the help of AC bridges, Q-meter.

Unit IV:
AC Potentiometer: Polar type and co-ordinate type AC potentiometer, application of AC potentiometers in electrical measurement.
Measurement of speed, frequency and power factor.

Unit V:
Digital measurement of electrical quantities: concept of digital measurement, block diagram, study of digital voltmeter, frequency meter.
Cathode ray oscilloscope: Basic CRO circuit (block diagram), cathode ray tube (CRT), and its components, application of CRO in measurement, lissajous pattern, Dual trace and dual beam oscilloscopes.

Reference Books:
3. M.B. Stout ,”Basic Electrical Measurement” Prentice hall of India, India.
UNIT-I
PN Junction Diode- minority Carrier injection in semiconductor, Carrier life time, Diffusion length, Continuity equation, potential variation within graded semiconductor, open circuited pn junction diode. Derivation of Diode Current equation with the help of space charge diagram, diode capacitance, switching time Tunnel diode, Varactor Diode, Schottkey Diode, Light Emitting Diode, photo diode, photo voltaic cell, Laser Diode with their working principle and characteristic

UNIT-II
Review of Configuration and characteristics of BJT, Early effect, Ebers-Moll Model, charge control model, biasing the BJT for discrete circuit design, Bias compensation, Small signal and low frequency analysis of BJT amplifier. BJT internal capacitance & high frequency model (CE model) Special amplifier circuit- Darlington pair, cascade amplifier, bootstrapping circuit.

Classification of Amplifiers: Power amplifier, Class A,B,C amplifiers, Coupling methods, Audio Amplifiers, Wide band amplifier

UNIT-III
MOSFET- Review of device structure, operation & V I characteristic. Ohmic and saturation region equations. Classification of MOS (NMOS, PMOS, CMOS, principle of working and comparison, MOSFET as an amplifier and switch, biasing of MOS amplifier circuit, CS, CG, CD configuration using NMOS, frequency response of a single stage CS amplifier. MOS internal capacitance and high frequency model(CS configuration only).

UNIT-IV
Feedback Amplifiers: Basic concept of feedback, General Characteristics of negative feedback amplifiers, Classification of feedback, Voltage/Current shunt and series feedback, stability of feedback amplifiers, Multistage Amplifiers, Tuned Amplifier.

UNIT-V
Oscillators; Condition for oscillation, generalized form of oscillator circuit, The phase shift oscillator, Hartley & Colpitt’s oscillator. The Wein Bridge oscillator, Crystal oscillator, frequency stability. Regulated Power Supplies: Series/Shunt voltage regulator, Monolithic regulators, SMPS,UPS ( block diagram)

Text Books:

Reference Books:
1. Shilling & Bel0ove/ Electronic Circuit/ McGraw Hill International
2. Streetman, B.G. Banerjee, Sanjay/ Solid State Electronic Devices/ PHIs
MATHEMATICS III
IMA - 301

Unit I: Series Solutions and Special Functions
Series solutions of ODE of 2nd order with variable co-efficient with special emphasis to differential equations of Legendre and Bessel, Legendre polynomials, Bessel functions and their properties.

Unit II: Integral Transforms
Fourier integral, Fourier complex transform, Fourier sine and cosine transforms and applications to simple heat transfer equations. Z-transform and its application to solve difference equations.

Unit III: Functions of a Complex Variable-I
Analytic functions, C-R equations and harmonic functions, Line integral in the complex plane, Cauchy’s integral theorem, Cauchy’s integral formula for derivatives of analytic functions, Liouville’s theorem, Fundamental theorem of Algebra.

Unit IV: Functions of a Complex Variable-II
Representation of a function by power series, Taylor’s and Laurent’s series, singularities, zeros and poles, Residue theorem, evaluation of real integrals of type
\[ \int_{0}^{2\pi} f(\cos \theta, \sin \theta) d\theta \quad \text{and} \quad \int_{-\infty}^{\infty} f(x) dx, \]
Conformal mapping and bilinear transformations.

Unit V: Statistics and Probability
Correlation and Regression, Binomial distribution, Poisson distribution, Normal distribution.

Reference Books:
   John Willey & Sons inc.
2. B.S. Grewal : Higher Engineering Mathematics,
   Khanna Pub.
3. Dennis G. Zill : Advanced Engineering Mathematics,
   CBS Pub.
4. I.N. Sneddon : Partial Differential Equations,
   Mc Graw-Hill
   Mc Graw-Hill
6. I.N. Sneddon : Use of integral transforms,
   Tata Mc Graw-Hill
ICS-305 CYBER LAW AND INFORMATION SECURITY

Unit-1

Unit -2

Unit -3

Unit 4

References:
1. Harish Chander “Cyber Law and IT Protection” , PHI Publication, New Delhi
2. Merkov, Breithaupt,“ Information Security”, Pearson Education
3. “Cyber Law in India” - Farooq Ahmad-Pioneer books.
IHU-301/IHU-401 DISASTER MANAGEMENT
(Compulsory for all B.Tech Branches)

Objective:
- The objective of this course is to familiarize the student with basic management principles relating to disaster management and mitigation techniques. (6)

Unit-1
- Concept of disaster management.
- Types of disaster and their impact: Natural and Man-Made, Like- Earthquakes, Floods, tsunami, Droughts, Cyclones, Avalanches, Forest Fire, Terrorism related disaster etc.
- Assessment of Human and Economic losses. (6)

Unit-2
- Impact of Extensive Industrialization.
- Impact of Global Warming and Environmental Degradation.
- National and global disasters. (6)

Unit-3
- Types of Responses : Central, State, District Level, People’s Community participation in Disaster Management.
- Post- Disaster Management and Rehabilitation measures. (6)

Unit-4
- Capacity Building from meeting disasters.
- Long-term measures for prevention of Disasters.
- Mitigation techniques/ strategies: Early warning systems, Data sharing at national and International level. (6)

Recommended Books:
1. Disaster Management by Dr. V.K. Sethi.
3. Environmental Management by Dr. Shakel Ahmad.
B.Tech (3rd & 4th Semester) Common to all branches

Human Values & Professional Ethics

Maximum Marks: 50
L T P: 3 0 0

Unit-1
Human Value Education: Understanding the need, basic guidelines, content and process for value education, self exploration - its content and process; Natural acceptance’ and Experiential Validation- as the mechanism for self exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirement for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly

6

Unit-2

6

Unit-3
Professional Responsibility: The basis and scope of Professional Responsibility, Profession and Norms of Professional Conduct, Ethical Standards versus Profession, Culpable mistakes, the autonomy of professions and codes of ethics. Employee status and Professionalism. Central Professional Responsibilities of Engineers: The emerging consensus on the Responsibility for safety among engineers, hazards and risks.

6

Unit-4

6

Unit-5
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers - consulting engineers - engineers as expert witnesses and advisors- moral leadership.

6

Text Books:

Relevant CDs, Movies, Documentaries & Other Literature:
1. Value Education Website, http://www uptu ac in
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United States, USA
5. IIT Delhi, Modern Technology- The Untold Story
6. The Hundred, Michael Hart