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

<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-601</td>
<td>Power System II</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>IEE-602</td>
<td>Conventional &amp; Computer Aided Design of Electrical Machines</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>IEN-601</td>
<td>Power Electronics</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>ICS-607</td>
<td>Microprocessors &amp; Microcontroller</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5.</td>
<td>IEC-605</td>
<td>Communication Engineering</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6.</td>
<td>IHU-601</td>
<td>Industrial Management</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**THEORY**

**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-651</td>
<td>Power System Lab I</td>
<td>0</td>
<td>0</td>
<td>03</td>
</tr>
<tr>
<td>8.</td>
<td>IEN-651</td>
<td>Power Electronics Lab</td>
<td>0</td>
<td>0</td>
<td>03</td>
</tr>
<tr>
<td>9.</td>
<td>ICS-657</td>
<td>Microprocessors &amp; Microcontroller Lab</td>
<td>-</td>
<td>-</td>
<td>03</td>
</tr>
<tr>
<td>10.</td>
<td>IEC-655</td>
<td>Communication Engineering Lab</td>
<td>0</td>
<td>0</td>
<td>03</td>
</tr>
<tr>
<td>11.</td>
<td>IGP-601</td>
<td>General Proficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td>17</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

**L-Lecture  T-Tutorial  P-Practical  CT-Class Test  TA-Teacher Assessment**

**Sessional Total** = Class Test + Teacher Assessment

**Subject Total** = Sessional total + End semester Examination
Unit-I:
**Representation of Power System Components**: Synchronous machines, Transformers, Transmission lines, single line diagram, Impedance and reactance diagram, per unit System.

**Symmetrical fault analysis**: Transient in R-L series circuit, calculation of 3-phase short circuit current and reactance of synchronous machine, internal voltage of loaded machines under transient conditions.

**Symmetrical components**: Symmetrical Components of unbalanced phasors, power in terms of symmetrical components, sequence impedances and sequence networks. (8)

Unit-II:
**Unsymmetrical faults**: Analysis of single line to ground fault, line-to-line fault and Double Line to ground fault on an unloaded generators and power system network with and without fault impedance. Formation of $Z_{bus}$ using singular transformation and algorithm, computer method for short circuit calculations. (8)

Unit-III:
**Load Flows**: Introduction, bus classifications, nodal admittance matrix ($Y_{bus}$), development of load flow equations, load flow solution using Gauss Siedel and Newton-Raphson method, approximation to N-R method, line flow equations and fast decoupled method. (8)

Unit-IV:

Unit-V:
**Traveling Waves**: Wave equation for uniform Transmission lines, velocity of propagation, surge impedance, reflection and transmission of traveling waves under different line loadings. Bewlay’s lattice diagram, protection of equipments and line against traveling waves. (8)

**References**:
UNIT-I
Basic Considerations:
Basic concept of design, limitation in design, standardization, modern trends in design and manufacturing techniques, Classification of insulating materials. Calculation of total mmf and magnetizing current. (7)

UNIT-II
Transformer Design:
Output equation, design of core, yoke and windings, overall dimensions, Computation of no load current to voltage regulation, efficiency and cooling system designs. (7)

UNIT-III
Design of rotating machines – I:
Output equations of rotating machines, specific electric and magnetic loadings, factors affecting size of rotating machines, separation of main dimensions, selection of frame size. Core and armature design of dc machines. (8)

UNIT-IV
Design of rotating machines – II:
Core and armature design of 3-phase ac machines, Rotor design of three phase induction motors. Design of field system of DC machine and synchronous machines. Estimation of performance from design data. (8)

UNIT-V
Computer Aided Design:
Philosophy of computer aided design, advantages and limitations. Computer aided design approaches analysis, synthesis and hybrid methods. Concept of optimization and its general procedure, Flow charts and ‘c’ based computer programs for the design of transformer, dc machine, three phase induction and synchronous machines. (10)

References:
UNIT-1

POWER CONVERTER COMPONENTS: Classification of power transistors: bipolar junction transistor, power MOSFET, insulated gate bipolar transistor, GTO silicon controlled rectifier, basic operation principle of an SCR, V-I characteristics, two transistor analogy, rating of an SCR, turn-on methods of a Thyristor, Thyristor turn-off process, gate characteristic of an SCR, Firing circuits of Thyristor, dynamic characteristics of SCR, series and parallel of SCR, protection of Thyristor. (12)

UNIT-2

CONTROLLED RECTIFIERS: Analysis of single phase controlled rectifiers (half wave, full wave and bridge) with different type of load, effect of source impedance on the performance of 1O full converter, Three phase converters, line commutated inverters, Dual converter, introduction to cycloconverters. (10)

UNIT-3

Principles of inverters, classification of inverters, single phase bridge inverters, series inverters, parallel inverters, Mc-Murray half Bridge Inverters, PWM inverters, switched mode power supplies. (8)

UNIT-4

Principle of choppers, analysis of chopper circuits, multi quadrant choppers, commutation of choppers, DC Jones chopper and Morgan chopper. (8)

UNIT-5

Converter and chopper controlled of DC motors, AC motor speed control, speed control by stator voltage variation, rotor resistance variation and slip energy recovery scheme. (6)

References:

1. Rashid, M.H, Power Electronics, Devices and applications /PHI
3. Vedam Subramanium, power Electronics: devices, Converters, and applications/ New Age Int.(P) Ltd.
4. Ned Mohan/ power electronics/ john Wiley
ICS-607 MICROPROCESSOR & MICROCONTROLLER

Unit-I: INTRODUCTION: MICROPROCESSOR 8085
General definition of minicomputer, microprocessors, writing assembly language problems, Assembler Directives, Assembly language Programming, 8-bit microprocessors: 8085 microprocessor: pin configuration, internal architecture, Timing & signals, control & status, interrupt: Hardware and Software interrupts, circuit. (8)

Unit-II: MICROPROCESSOR 8085/8086
MICROPROCESSOR 8085: Machine cycles, Instruction cycle, Bus size and Signals, Instruction set of 8085, addressing modes, instruction format, 8085 programming, introduction to 8086, Pin diagram, architecture, basic instructions, scalar and vector processor, parallel processor, digital signal processor. (8)

Unit-III: I/O INTERFACE
Interfacing with Peripheral devices and memory: I/O addressing-I/O mapped and memory mapped I/O schemes, 8255(PPI), 8257(DMA Controller), 8259(Interrupt priority Control), 8253/8254 Programmable timer/counter with modes of operation, Interfacing, Serial communication Standards: 8251,USART Interfacing RS-222, ADCIC(0808) (8)

Unit-IV: INTRODUCTION TO MICROCONTROLLERS

Unit-V: 8051 MICROCONTROLLER
Overview of 8051 microcontroller, architecture, I/O ports and memory organization, addressing modes and instruction set of 8051, counters and timers, simple programs, application of microcontrollers, interfacing 8051 to LED’s push button, relay’s and latch connections, Keyboard and display interface-closed loop control of servo motor control, washing machine control. (8)

Text Books:
2. M.Rafiquzzaman, “Microprocessors and Applications”, PHI
IEC- 605 Communication Engineering

UNIT-1
Continuous Wave Modulation
Measure of Information, Entropy and Information Rate, Channel Capacity, Harley shanon Law, Amplitude Modulation and Detection, Frequency Modulation and Detection. Noise in communication systems, Frequency Division in Multiplexed. (10)

UNIT-2
Pulse Modulation
Base Band signal Characterization, Sampling Theorem and Sampling Techniques, Signal Reconstruction in time domain, Analog Pulse Modulation systems: Pulse Amplitude Modulation, Pulse width Modulation and Position Modulation. (8)

UNIT-3
Wave form coding Techniques
Pulse code Modulation Noise, Binary & Mary system, Band width Requirement of PCM Delta Modulation, Division Multiplexy Digital Modulation, Frequency and Phase shift keying Probability of Error. (4)

UNIT-4 & 5
Introduction to practical Communication system
Wire Telephone System, Public Telephonic Networks (2)
Facsimile and Television System, Television Signal, Transmission, Television (3)

Radar and Communication System
Pulse Radar system, Mobile Communication Concepts, FDMA, TDMA, CDMA. Techniques. (3)

Satellite Communication systems
Introduction, Orbits, Power Supply System, Attitude Control, Satellite Station Keeping Antenna Angles, Selection Frequency, Polarization. (3)

Optical Communication System
Introduction to optical fiber Dispersion and Losses, Light source, Connectors and Splicers. Fiber Optic Communication. (3)

Reference:
1. B.P Lathi/ “Modern Analog & Digital Communication”/ John Wily
2. Taub Schilling/” Principle of Communication Systems”/ T.M.H
4. Roddy, Dennis and Cooler/ “Electronic Communications”/ P.H.I
IHU-601 Industrial Management

UNIT-1

Basic concepts, meaning, nature, significance of management & scientific management, types & function of management, evolution of management thoughts. (6)

UNIT-2

Decision Making-concept, types of decision, significations, process.
Motivation-concept, types of motives, significance, pre-requisites, process, theories. (6)

UNIT-3

Organization- Concept, types, principles, theories.
Re-engineering- Concept, relevance. (6)

UNIT-4

Human Resource Planning- Concept, significance, process, Job analysis, group behavior, performance appraisal, job description. (6)

References:

4. Crier, “Network Re-engineering”, Sri Eshwar Enterprise,