B.Tech ELECTRICAL Engineering (AKU Syllabus) SEMESTER- VII

EC 1x06 INTELLIGENT INSTRUMENTATION L-T-P: 3-0-3 Credit : 5

Theory :

1. Intelligence, features characterizing intelligence, intelligent instrumentation system: features of intelligent instrumentation, components of intelligent instrumentation, block diagram of intelligent instrumentation. **Lecture : 6**

2. Signal amplification & attenuation (OP-AMP based), instrumentation amplifier (circuit diagram, high CMRR & other features), signal linearization(different types such as diode resistor combination, OP-AMP based etc.), bias removal signal filtering (output from ideal filters, output from constant – k filters, matching of filter sections, active analog filters). **Lecture : 10**

3. OP-AMP based voltage to current converter, current to voltage conversion, signal integration, voltage follower (pre amplifier), voltage comparator, phase locked loop, signal addition, signal multiplication, signal transmission, description of spike filter. **Lecture : 8**

4. Smart sensors : Primary sensors, excitation, compensation, information coding/processing, data compensation, standard for smart sensor interface. **Lecture : 10**

5. Interfacing instruments and computers : basic issues of interfacing, address decoding, data transfer control, A/D convertor, D/A convertors, sample & hold circuit, other interface considerations. **Lecture : 8**

Text Books :

1. Principles of measurements and instrumentation by Alan S Morris, PHI
2. Intelligent instrumentation by Bamay, G.C.Prentice Hall

Reference Books :

1. Sensors and transducers by Parranabis, PHI
2. Introduction to digital signal processing: MGH

INTELLIGENT INSTRUMENTS LAB :

As per syllabus experiments are to be framed. Minimum 8 experiments are required to be performed

EE 1x12 LINEAR CONTROL THEORY L-T-P : 3-0-3 Credit : 5

1. Introduction : The control system, servomechanism, servomotors, standard test signal. **Lecture : 4**

2. Time response analysis : Time response of second order system, design consideration for higher order system, stability relative stability. **Lecture : 6**

3. The root locus technique : Concept, construction of root loci root contours systems with transformation log. **Lecture : 8**

4. Frequency response analysis : Correlation between time and frequency response, bode plots, root locus and minimum phase system log magnetic vs phase plots , stability in frequency domain , polar plots. **Lecture : 8**

5. Mathematics preliminaries, Nyquest stability criteria, Assessment of relation stability using Nyquest criteria. **Lecture : 5**

6. Closed loop frequency response. Lecture : 3

7. Compensation of control system : Introduction, type compensation approach to compensation. **Lecture : 8**

Text Books :

1. Modern control system by Nagrath & Gopal

Reference Books :

1. Modern Control Engineering by K.Ogata, Pearson Education.
2. Control Engineering by Kuo.

EE 1x13 PROTECTION OF POWER APPARATUS & SYSTEM

L-T-P : 3-0-3 Credit : 5

1 Name and cause of faults. Lecture : 2

2. Schemes of protection : Methods of fault discrimination. **Lecture : 3**

3. Protective relays : Construction and operating principle of over current relays, directional relays, Distance relays, Differential relays. **Lecture : 5**
4. Protection of feeders : Over current protection and distance protection **L: 5**
5. Protection of transformer and generator. **Lecture : 5**
6. Mechanism of are interruption, Restriction voltage ,Recovery voltage, RRRV, factors affecting the performance of circuit breaker, current chopping. **L : 6**
7. Circuit breaker, construction and operating principle of air blast,oil,SF6 and vacuum circuit breaker. **Lecture : 7**
8. Protection against over voltage : cause of over voltage , lightning phenomenon, lightning arrestors, surge absorber , insulation co-ordination. **Lecture : 5**
9. Grounding : Advantage, solid, resistance and reactance grounding, Peterson coil. **Lecture : 4**
Text Books :
1. Power System Protection & switch Gear by B.Ram & D.N Vishwakarma, TMH
2. Power System Protection and switch gear by R & C
Reference Books :
1. Art & science Protection Relaying by Moson
2. Switch gear and Protection by Sunil S.Rao, Khanna Publication