UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Organizational Behavior
Course Code: HU801
L-T Scheme: 3-0 **Course Credits: 2**

Introduction:

This course helps students to learn about the intricacies of work and politics within an organization. The basic outcome of this course would be:

- To understand the term organization
- To understand how it works in professional field.
- To brush up skills that will lead to success
- To understand Leadership
- To learn theories that will help to relate
- To handle stress
- To avoid conflicts
- To understand the basics of workplace and beyond.

Objectives:

Students in this course learn to get accustomed to workplace and they understand how to keep going in this world called profession. This course teaches them to be more confident and the theories which talks about the basic survival within the professional world.

Learning Outcomes:
Knowledge:

1. Learning about organization
2. Personality development
3. Job satisfaction and factors responsible for the same
4. Motivation theories
5. Group behavior
6. Communication process
7. Organizational politics
8. Handling stress

Course Contents:

Unit 1: Organizational Behaviour: Definition, Importance, Historical Background, Fundamental Concepts of OB, Challenges and Opportunities for OB. Personality and Attitudes: Meaning of personality, Personality Determinants and Traits, Development of Personality, Types of Attitudes, Job Satisfaction. Perception: Definition, Nature and Importance, Factors influencing Perception, Perceptual Selectivity, Link between Perception and Decision Making. Motivation: Definition, Theories of Motivation Maslow's Hierarchy of Needs Theory, McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory

Unit 2: Group Behaviour: Characteristics of Group, Types of Groups, Stages of Group Development, Group Decision Making. Communication: Communication Process, Direction of Communication, Barriers to Effective Communication. Leadership: Definition, Importance, Theories of Leadership Styles.

Course Description

Unit 3: Organizational Politics: Definition, Factors contributing to Political Behaviour. Conflict Management: Traditional vis-a-vis Modern View of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation – Bargaining Strategies, Negotiation Process.

Unit 4: Organizational Design: Various Organizational Structures and their Effects on Human Behaviour, Concepts of Organizational Climate and Organizational Culture.

Text Books

Robbins, S. P. & Judge, T.A.: Organizational Behavior, Pearson Education, 15th Edn.
Resources, PHI, 10th Edn.

UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR

Course Description

Title of Course: HVDC Transmission
Course Code: EE801A
L-T-P: 3-0-0 **Course Credits:3**

Introduction:

This course gives a thorough understanding in the various aspects high voltage DC transmission.

Objectives:

The objective of the course is to introduce the student the scheme of operations of high voltage DC transmission.

Knowledge:

Understanding of high voltage dc generation and transmission.

Application:

High voltage DC is very much pertinent in the current scenario of electrical power transmission as it involves better features as compared to high voltage AC transmission.

Introduction: Introduction of DC power transmission technology, comparison of AC and DC transmission, limitation of HVDC transmission, reliability of HVDC systems, application of DC transmission, description of DC transmission system, planning for HVDC transmission, modern trends in DC transmission.
Analysis of HVDC converters: Choice of converter configuration, simplified analysis of Graetz circuit, converter bridge characteristics, Characteristics of a twelve pulse converter, detailed analysis of converters.
Control of HVDC converter and systems: Necessity of control of a DC link, rectifier control, compounding of rectifiers, power reversalof DC link, voltage dependent current order limit(VDCOL) characteristics of the converter, inverter extinction angle control, pulse phase control, starting and stopping of DC link, constant power control, control scheme of HVDC converters.
Harmonic and filters: Generation of harmonics by converters, characteristics of harmonics on DC side,characteristics of current harmonics, characteristic variation of harmonic currents with variation of firing angle and overlap angle, effect of control mode on harmonics, noncharacteristic harmonic. Harmonic model and equivalent circuit, use of filter, filter configuration, design of band-pass and high pass filter, protection of filters, DC filters, power line communication and RI noise, filters with voltage source converter HDVC schemes.
Fault and protection schemes in HVDC systems: Nature and types of faults, faults on AC side of the converter stations, converter faults, fault on DC side of the systems, protection against over currents and over voltages, protection of filter units.
Multiterminal HVDC systems: Types of multiterminal (MTDC) systems, parallel operation aspect of MTDC. Control of power in MTDC. Multilevel DC systems. Power upgrading and conversion of AC lines into DC lines, Parallel AC/DC systems, FACTS and FACTS converters.

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Text Books:

1. HVDC Transmission, S. Kamakshaiah& V. Kamaraju, Tata McGraw hill education.
2. HVDC Power transmission system, K.R.Padiyar, Wiley Eastern Limited.

Reference Books:

1. The Performance, Operation and Control of EHV Power Transmission Systems, A.Chakraborty, D.P. Kothary, A.K. Mukhopadhyay, Wheeler Pub.
2. High Voltage Direct Current Transmission, J. Arrillaga, Peter Pregrinu.
Extra High Voltage AC Transmission Engineering, Rakosh Das Begamudre, New Age International (P) Ltd.
3. High Voltage Direct Current Power Transmission, Colin Adamson and N.G.Hingorani, Garraway Limited, London

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Illumination Engineering
Course Code: EE801B
L-T Scheme: 3-1 **Course Credits: 3**

Introduction:

This course is an attempt to explore the understanding and knowledge of illumination as an engineering and art.

Objectives:
In this course students will learn to design and control of lighting systems.

Learning Outcomes:
Knowledge:
1. Understand lighting fundamentals
2. To learn and basics of lighting design
3. To learn the science and engineering light sources

Application:
1. To implement the lighting applications for environmental aspects.

Course Contents:
Unit 1: Sources of light: Day light, artificial light sources, energy radiation, visible spectrum of radiation, black body radiation and full radiator. Incandescence, dependence of light o/p ontemperature. Theory of gas discharge and production of light. Perception of light and color,optical system of human eye, eye as visual processor. Reflection, refraction and otherbehavior of light.
Unit 2: Measurement of light - radiometric and photometric quantities, units of measurement, standardization. Measurement of light distribution, direct and diffused reflection,fundamental concepts of colorimentry and measurement of colour.

Unit 3: Light production by gas discharge, fluorescence, incandescence, daylight principle of operation, light efficacy, color, electrical characteristics, typical applications, dimming condition of GLS filament, tungsten halogen lamps, fluorescent tubes, compact fluorescent lamp (CFL), low and high pressure sodium lamps, high pressure mercury lamp, metal halide lamp. Functions of luminaries, classification, Materials Used in luminaries manufacturing,reflection, refraction, diffusion, polarization and optical design, photometric measurements, application data and its use. LED, OLED, Lasers.

Unit 4: Objectives quantity and quality of light, selection of lamps, luminaries section, placement. Design considerations for lighting of offices, conference rooms, hospitals, teaching places,house etc.design calculations. Tools used for lighting design.

Unit 5: Types of lighting controls, strategy for selection, benefits of lighting control. Electric distribution system for lighting, maintenance strategies, group replacement schedule.Techniques of achieving energy efficient lighting design, role of computers in lightingdesign, advantages and limitations of computer aided lighting design.
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Course Description

Text Books

1. Utilization of Electric Power, C.L. Wadha, New Age International Ltd..

References

1. IES Lighting Handbook..

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Course Description

Title of Course: Energy Management & Audit
Course Code: EE801C
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:-

- To introduce the students with fundamental concepts regarding Energy Management and audit to minimise energy cost , wastage, minimise adverse effect on environment.
- To introduced the student with energy availability from different source in our world
- To introduced the student with energy consumable equipment in our peripheral
- To introduce the students with different parameter which are directly and indirectly related to energy consumable items,

Objective:-

Students should have a clear idea about verity energy sources and their stock for the futureneeds. so each and every student should plan how to manage the limited source of Energy by which our country will enjoy that source for a long run. Besides that each student will get a clear idea of substitute energy sources like renewable energy sources. Student should make a plan to use more and more renewable energy sources instead of consuming non renewable energy sources. for to keep energy consumption within limit student should audit perfectly regarding energy consumption and performance of energy consuming equipment

Learning Outcomes:

Knowledge:

1. Student are able to gain knowledge on general aspect of energy management and energy audit focus on global and Indian energy scenario, energy management and audit principle, guidance for implementation in energy use.
2. it will help to know energy efficiency in thermal utilities, focus on basic principles, guide to efficient operation of boiler,furnace,cogeneration,and efficient use of steam and application of waste heat recovery system
3. understand how to gain maximum energy in electrical utilities generally used in industries, guide to efficient operation of equipment like motor,compressor,refrigeration,cooling tower,DG set, lighting system
4. student are able to gain knowledge on energy scenario, energy conservation Act and its related policies, efficiencydependence on climate condition.

Application:-

1. Energy management & Audit procedure can be applied on any energy consuming organization for to
2. Reduce energy consumption.
3. Energy saving, pollution related hazardous condition.

Course content:-

Unit 1: Energy Scenario:-Commercial and Non-Commercial Energy, Primary Energy Resources, Commercial Energy Production, Final Energy Consumption, Energy Needs of Growing Economy, Long Term Energy Scenario, Energy Pricing ,Energy Sector Reforms, Concept of smart grid, Tariff.

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Unit 2: Energy Management &Audit: Definition,Energyauditneed,Typesofenergyaudit,Energymanagement(audit) approach-understandingenergycosts,Benchmarking,Energyperformance,Matching energyusetorequirement,Maximizingsystemefficiencies,Optimizingtheinputenergy requirements,Fuelandenergysubstitution,Energyauditinstrumentsandintervalsof EA regulation.

Unit 3: Energy Efficiency and Climate changes: Energy and environment, Air pollution, Climatechange,United Nations Framework Convention on climate change (UNFCCC), Kyoto Protocol, Clean Development Mechanism (CDM), CDM methodology and Procedures, Sustainable development

Unit 4: Non-Conventional Energy Sources: Concept of renewable Energy and importance, Different types of renewable Energy, Solar energy, Windenergy, Biomass energy, Hydro-energy, Fuelcells, Energy from wastes, Wave, Tidal and geothermal. Concept of energy storing device.

Unit 5: Energy Efficient Technologies in Electrical Systems: Maximum demand controllers, Automatic power factor controllers, Energy efficient motors, Softstarters with energy saver, Variable speed drives, Energy efficient transformers, Electronic ballast, Occupancy sensors, Energy efficient lighting controls, Energy saving potential of each technology.

Unit 6: Energy Conservation Act-2001 and related policies: Energy Conservation Act-2001 and its features, Notification Undertheact, Designated agencies, Schemes of Bureau of Energy Efficiency (BEE)-ECBC, S&L, DSM, BLY, SME's, Designated Consumers, Electricity Act2003, Integrated Energy Policy,

Text Book-(Reference):

1.Bureau of Energy Efficiency Guide published from NPC
2.Energy Management Handbook by John wiley C. Turner
3.National Action Plan on Climate Change by Prime Minister 's Council on Climate Change

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Power Plant Instrumentation & Control
Course Code: EE802A
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

This course examines various electrical energy sources like conventional energy sources, non conventional energy sources, impotence of instrumentation in power generation and control, their setup, various P&I diagrams for thermal generation plant, various control stringiest of power plants, Turbine monitoring system , Generator and Bus bar coupling instruments, Data Accusation system for power plant. The Topics to be covered (tentatively) include:

- General concepts power plants of different types Setups
- Thermal, Hydel, and Nuclear plants power plant and system instrumentation.
- Instrumentation for various thermal power plant process and equipments
- Controlling scheme for boiler, compressor, furnace draft etc.
- Process data handling-processing
- Instrumentation for Generator and Busbar coupling

Objectives:

In this course we will study various electrical energy sources like conventional energy sources, non conventional energy sources, impotence of instrumentation in power generation and control, their setup, various P&I diagrams, hookup drawings for instrument installation for thermal generation plant, various control stringiest of power plants, Turbine monitoring system , Generator and Bus bar coupling instruments, Data Accusation system for power plant examples for Boiler Control - Steam pressure control, combustion control, Furnace Draft control, Steam temperature control, Feed water control, Data logger and computer control, supervisory control and monitoring system. Instrumentation for safety interlocks - protective gears, emergency measures, Alarm systems and Analysis etc. Pollution measurement, monitoring and control

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Learning Outcomes:

Knowledge:

1. Understand the requirement of instrumentation in power generation and control.
2. You will able to read hook drawing for instrumentation setup and installation..
3. You will able to read piping and Instrumentation diagrams.
4. Become aware of the instrument used for TG set, Condensers, Boilers, Coal handling plants, water treatment plants.
5. Know the problems in the design boiler drum level control for single element and two element.
6. Learn power plant simulation and modeling.
7. Learn about DATA accusation system for thermal power plant.
8. Understanding ISA and SAMA diagramming symbols.
9. An overview of instruments used for Generator and bus bar coupling, instrument used alternator and bus bar synchronization.

Application:

1. To design, installations and testing of instruments used in power plant process.
2. To design, installations and testing of instruments used for renewable energy.
3. To developed various type of drawings like p&I drawings, hook drawing for power plant Instrumentation setup.
4. To selection and sizing of automation system used thermal, Hydel or nuclear power plants for power plants.

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Course Description

Course Contents:

Unit 1: General Concepts-Power Plants of different types : Setups, energy conversions and measurement requirements, examples of Thermal, Hydel, and Nuclear plants. Thermal power plant and system instrumentation.

Unit 2: Instrumentation for-1) Turbines 2) Condensers 3) Generators 4) Coal handling 5) Water treatment 6) Feed water, combustion air and flue gases.

Unit 3: Control-Boiler Control - Steam pressure control, combustion control, Furnace Draft control, Steam temperature control, Feed water control, Data logger and computer control, supervisory control and monitoring system. Instrumentation for safety interlocks - protective gears, emergency measures, Alarm systems and Analysis etc. Pollution measurement, monitoring and control

Unit 4: Data handling-processing-Data handling-processing, logging, acquisition, accounting, display and storage. Instrumentation for Generator and Busbar coupling. Introduction to power plant modeling/simulation.

Text Books

1. Principles of Industrial Instrumentation, D. Patranabis, TMH New Delhi.
2. Power Plant Instrumentation,K. **Krishnaswamy,M.Ponnia bala,PHI lerning, New Delhi.**

References

1. Electric Power Engineering Handbook – Edited by L. L. Grigsby.
2. Instrument Engineers Handbook, B. G. Liptak, Chilton Book Co., Philadelphia.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: SENSORS & TRANSDUCERS
Course Code: EE802B
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

This course examines control system analysis and design concepts in classical and modern state space methods. The Topics to be covered (tentatively) include:

- Understanding various concepts of sensing
- Knowledge of transducers
- Various sensor devices and their applications

Objectives:

The Course Educational Objectives are:

1. In recent years, sensors have assumed an increasingly important role in the development and advancement of modern civilization and technology. Practically every aspect of our day-to-day activities is affected by some type of control systems.
2. Sensors are found in abundance in all sectors of industry, such as equality control of manufactured products, automatic assembly line, machine-tool control, space technology and weapon systems, computer control, transportation systems, power systems, robotics and many others.
3. In this subject it is aimed to introduce to the students the principles and application of sensors in everyday life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems infrequency domain and time domain.

Learning Outcomes:

Knowledge:

Once the student has successfully completed this course, he/she will be able to answer the following questions or perform following activities:

1. Able to understand the basic concepts of sensors.
2. Able to describe different transducers.

Course Contents:

Unit 1: INTRODUCTION

Definition, principles of sensing and transduction, classification

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Unit 2: MECHANICAL AND ELECTROMECHANICAL SENSORS

a) Resistive (potentiometric) type: resolution, accuracy, sensitivity
b) Strain Gauges: theory, types, sensitivity, gauge factor, variation with temperature
c) Inductive sensors: common types- reluctance change type, mutual inductance change type, transformer action type, magnetostrictive type
d) LVDT: Construction, output-input relationship, I/O curve, discussion

e)Proximity sensor

Unit 3: CAPACITIVE SENSORS

a) Variable distance- parallel plate type
b) Variable area- parallel plate, serrated plate/teeth type and cylindrical type
c) variable dielectric constant type

PIEZOELECTRIC ELEMENTS

a) piezoelectric effects, charge and voltage coefficients
ultrasonic sensors

Unit 4THERMAL SENSORS

a) Material expansion type: solid, liquid, gas and vapour
b) Resistance change type: RTD, materials, construction, tip sensitive and stem sensitive type, Thermister materials, shapes, ranges, accuracy specifications

Thermoemf sensors: types, thermoelectric powers, general consideration

Unit 5: MAGNETIC SENSORS

a) Sensors based on Thomson effect
b) Hall effect and Hall drive, performance characteristics

RADIATIONSENSORS

a) LDR, photovoltaic cells, photodiodes, photo emissive cells- types, materials, construction, respons
b) Geiger counters
c) Scintillation detectors

Introduction to Smart sensors

Unit 6: VELOCITY, ACCELERATION SENSORS

a) Electromagnetic velocity sensor; spring-mass-system, measurement of deflection
b) Principle of accelometers, sensitivity, noise

FLOW

a) Pressure gradient technique
b) Rotameter thermal transport technique
c) Electromagnetic sensor

Ultrasonic sensors

Text Book

Sensor & transducers, D. Patranabis, 2nd edition, PHI

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Course Description

References

1. Instrument transducers, H.K.P. Neubert, Oxford University press.
2. . Measurement systems: application & design, E.A.Doebelin, McGraw Hill

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Biomedical Instrumentation
Course Code: EE802C
L-T Scheme: 3 **Course Credits: 3**

Introduction:

This course will cover various systems of the human physiology, signals of biologicalorigin obtained from these systems, biosensors, transducers, bio electrodes used toacquire such signals, and amplifiers for measuring bio potentials. Electrical safety ofmedical devices; measurements of the blood pressure, blood flow, respiratory system,clinical laboratory equipment, medical imaging, and bioethics will also be discussed.The main objective of this course is to introduce student to basic biomedicalengineering technology. As a result, student can understand, design and evaluate systems and devices that can measure, test and/or acquire biological information fromthe human body.

Objectives:

In this course we will study the basic knowledge of the operating principles of electrical and other transducers, analog and digital instrumentation, applied signal acquisition and processing, electrical safety in the medical environment, electrical properties of nerve and muscle physiology; and instrumentation used in cardiopulmonary, neurological, surgical, and rehabilitation areasof medicine

Learning Outcomes:
Knowledge:

Students will be able to

1. Apply the principles of electronic circuits and devices to the use
2. Apply the principles of electronic circuitsin the design ofinstrumentation in the biomedical area.
3. To introduce students to the measurementsinvolved in some medical equipment.
4. In-depth understanding of specialist bodies of knowledge within the engineering discipline.
5. Application of established engineering methods to complex engineering problem solving.
6. Fluent application of engineering techniques, tools and resources.
7. Explore new developments for better management or assessment of conditions.
8. Describethe origin of biopotentials
9. Understand the purpose of biopotential electrodes
10. Explain the functional components of various biomedical instruments
11. Identify a range of methods which are used to diagnose, monitor or manage conditions.
12. Explore new developments for better management or assessment of conditions.

Application:

1. Ability to understand diagnosis and therapyrelated equipment.
2. Understanding the problem and ability toidentify the necessity of an equipment to aspecific problem
3. Demonstrate a basic understanding of disease, medical conditions or physiological conditions.
4. Understand the functional components of various instruments
5. Suggest a range of methods, which are used to diagnose, monitor or manage conditions.
6. Demonstrate a critical appreciation of various biomedical instruments
7. Designbio potential amplifiers
8. Identify common signal artifacts and their sources

9. Acquire various bioelectric signals from the body surface
10. Interpret characteristic features in the most commonbiomedical signals
11. Understand the design principles of cardiac pacemakers, neurostimulators and defibrillators
12. Explainmeasurement principles for blood flow, pressureand volume
13. Describe measurementmodalities for respiratory variables and ventilation
14. Explainmeasurement basis and purpose of biochemical sensors
15. Explain disease, medical conditions or physiological conditions.

Course Contents:

Unit 1(Fundamentals): IntroductiontoPhysiologicalSystems–Organism,Cardiovascular,Respiratory,Renal,Hepatic,Gastrointestinal,Endocrinal, Nervous, Muscular, Cellular
BiologicalSignals–Bioelectricevents,Biomechanical Systems,Cellular&Membranephenomenon. TheAction PotentialandPropagationthroughNervousSystem.ThePeripheralNervousSystemsand sensory mechanisms. Biomaterials.
FundamentalsofElectrophysiology–EKG, EEG,EMG,Evokedpotentials.Quantification of Biological Signals.

Unit 2 (Measurement &Analysis): BiologicalSensors-Bio-electrodes,BiosensorsandTransducersforCardiology,Neurology,Pulmonary,
Oxygensaturation&gaseousexchange,flowmeasurement,goniometry,Endoscopy,ImpedancePlethysmography.
BiologicalAmplifiers–
InstrumentationAmplifiersforElectrophysiology(ECG,EMG,EEG,EOG),Filters,Power Supplies.
Recordingand Displaysystems, Digital Conversion for storage, Electrical Hazards in measurements,Isolation Circuits,calibration,alarms&Multi-channelre-constitution
Hospitalrequirements–Multi-parameterbed-sidemonitors,CentralNursingStations,Defibrillators,Ventilators,Catheters, Incubators.

Unit 3(Life-Support&Treatment):
CardiacSupport:Implantable&programmablePacemakers,External&InternalDefibrillators,CoronaryAngiography.
Electro-physiotherapy:Shortwave&ultrasonicdiathermy,Transcutaneous
NerveStimulatorsinpainrelief,TractionSystems,Ultrasoundinbonefractureregeneration,hypothermia&hyperthermiasystems. Lasersintreatmentandsurgery: Ophthalmic,Ablators,Endoscopic
AssistsandArtificiallimbs-Orthoses,passiveand poweredProstheses.

Unit 4(Imaging): FundamentalsofX-Rays,RadiologicalImaging,DigitalRadiology,DSA.
ComputerTomography,ImageProcessing,solidstatesensors,whole-bodyscans
Gammacamera&radio-isotopeimaging
Ultrasonography-
Transducers,SignalConditioners,2D&3Dscans,Doppler&ColorDopplerFundamentalsofMagneticResonanceImagingandPET- scans

Text Books

1. R S Khandpur: -HandbookofBiomedicalInstrumentation(Tata–McgrawHill Education) [PartlyDownloadable]

2. MEValentiniuzzi: - UnderstandingtheHumanMachine-APrimerforBioengineering[FreelyDownloadableinPDF] (WorldScientificPublishingCo.Pte.Ltd,Singapore)

References

1. L Cornwell, F. J. Weibell& E. A. Pfeiffer: -Biomedical Instrumentation and Measurements (Prentice Hall / Medical)
2. J G Webster & J W. Clark: - Medical Instrumentation– Application & Design (Houghton Miffin Pub)
3. J J Car r& J M Brown: - Introduction to Bio-medical Equipment Technology (Regents / Prentice Hall)
4. J Tompkins & J G Webster: - Design of Micro-controller based Medical Instrumentation (Prentice Hall Inc)
5. W.B.Blesser: - AsystemsapproachtoBiomedicine(McGrawHill.,NY)
6. JHUBrown,JE Jacobs&L Stark: - BiomedicalEngineering(DavisCo,Philadelphia,USA)
7. LAGeddes&LE Baker: -PrinciplesofAppliedBiomedicalInstrumentation(JohnWiley&sons,NY)
8. JHMilsum: - BiologicalControlSystems(McGrawHill,NY)
9. RPlonsey: - BioelectricPhenomena(McGraw-HillCo,NY)

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Process Control
Course Code: EE802D
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

This course examines General view of process, Process control & automation Basic process control loop block diagram. Characteristic parameter of a process, and functions of different modes of control actions, Schemes and analysis. The Topics to be covered (tentatively) include:

- Process control & automation
- Characteristic parameter of a process, Process quality, Process potential, Process resistance, Process capacitance, Process lag, Self regulation
- Process modeling, Process equations and their limitations
- Characteristics and functions of different modes of control actions
- Process reaction curves- Controllability
- Different control strategies-schemes
- Final control element
- Introduction to Programmable Logic controllers

Objectives:

In this course we will study the concepts process, Process control & automation, process control loop block diagram. Characteristic parameter of a process, and functions of different modes of control actions, Schemes and analysis reaction curves- Controllability-using (i) deviation reduction factors (ii) gain Band width product, State control liability. Tuning controllers, Final control element: Actuators (Pneumatic actuators, Electrical actuators) and control valves , Introduction to Programmable Logic controllers : Basic Architecture and function,Input- output modules and interfacing, CPU and memory, Relays, Timers, Counters and their uses.

Learning Outcomes:

Knowledge:

1. Understand the theory Process control & automation, Servo and regulatory control, Basic process control loop block diagram.
2. You will examine Process potential, Process resistance, Process capacitance, Process lag, Self regulation. Process modeling, Process equations and their limitations-general approach.
3. You will final control element: Actuators (Pneumatic actuators, Electrical actuators) and control valves.
4. Become aware Process reaction curves- Controllability-using (i) deviation reduction factors (ii) gain Band width product, State control liability.
5. Know the Brief study of safety valves and Solenoid valves.
6. Learn to calculate Schemes and analysis of On-Off, Multi step, Floating, Time proportional, PID control
7. Learn File systems and methods of accessing
8. Understanding effect of disturbances and variation in step input process control. Offset-why it appears and how it is eliminated-analysis and mathematical treatment.
9. Different control strategies-schemes, brief analysis and uses (i)Ratio control (ii) Cascade control (iii) Feed forward control (iv) Multivariable control.

Application:

1. To design, implement, different control strategies-schemes for different process.
2. To develop, implement, PLC programming and applications for various plant processes

Course Description

3. To selection of different types of final control element and control valve for smooth operation of process

4. To develop Process reaction curves- Controllability and able to Tuning controllers using Ziegler-Nichols, Cohen, PRC Method and3-C method of parameter adjustment

Course Contents:

Unit 1: Introduction- General view of process, Process control & automation, Servo and regulatory control, Basic process control loop block diagram. Characteristic parameter of a process, Process quality, Process potential, Process resistance, Process capacitance, Process lag, Self regulation. Process modeling, Process equations and their limitations-general approach. Typical processes and derivation of their functions. Characteristics and functions of different modes of control actions, Schemes and analysis of On-Off, Multi step, Floating, Time proportional, PID control. Effect of disturbances and variation in step input process control. Offset-why it appears and how it is eliminated-analysis and mathematical treatment.

Unit 2: Process reaction curves- Controllability-using (i) deviation reduction factors (ii) gain Band width product, State control liability. Tuning controllers: both closed and open loop methods (Ziegler-Nichols, Cohen, PRC Method and3-C method of parameter adjustment) Electronic PID controller design Pneumatic controllers-brief analysis.

Unit 3: Different control strategies-schemes, brief analysis and uses (i)Ratio control (ii) Cascade control (iii) Feed forward control (iv) Multivariable control.

Unit 4: Final control element: Actuators (Pneumatic actuators, Electrical actuators) and control valves (Globe, Ball. Butterfly, Gate, Pinch),different parts, Fail Position, Valve Characteristics, CV, single & Double seated valves, Valve sizing, Valve selection, Cavitations, Flashing, Noise. Control valve accessories-Air filter regulator, I/P converter, Pneumatic positioner, Electro Pneumatic positioner, limit switches, Motion transmitter. Brief study of safety valves and Solenoid valves.

Unit 5: Introduction to Programmable Logic controllers : Basic Architecture and function, Input- output modules and interfacing, CPU and memory, Relays, Timers, Counters and their uses, PLC programming and applications, Introduction to DCS.

Text Books

1. Principle of Process control, D. Patranabis, TMH.
2.Automatic Process Control ,D.P. Eckman, JohnWiley.
3. Process control ,P. Harriott, McGraw Hill.
4. Process Control By K. Krishnaswamy , New Age International

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References

5.Chemical process control ,G.Stephanpoulos, PHI
6.Process control instrumentation technology, C.D .Johnson, PHI
7.Process Control-Principles and application, S. Bhanot ,Oxford University press.
8.Process Control, S.K. Singh, PHI
9.Process dynamic & Control, S. Sundaram, Cengage Learning.
10.Instrument Engineers Handbook ,B.G .Liptak, Chilton Book Co. Philadelphia.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Grand Viva **Course Code: EE881**
L-T –P Scheme: 0P **Course Credits: 4**

Aims and Objectives

1. To compare the traditional viva examination (TVE) with OSVE (Objective Structured Viva Examination).

2. To obtain the students' opinion regarding OSVE as an assessment tool.

3. A suggestion to include OSVE as a part of university examination.

Materials and Methods

The study was carried out in November 2012, at K.J. Somaiya Medical College, in the department of Anatomy. 50 students were exposed to different stations of viva as well as OSVE. A comparison was made of the student's performance and a feedback was taken from the students regarding the same.

As the OSVE was being conducted for the first time, the students were notified in advance regarding the plan for conducting the part ending practical assessment – by both the TVE and OSVE. The OSVE was planned for 20 marks, viva voce of 20 marks.

Purpose and Format of the Viva Voce Examination

Literally, "viva voce" means by or with the living voice - i.e., by word of mouth as opposed to writing. So the viva examination is where you will give a verbal defence of your thesis.

Put simply, you should think of it as a verbal counterpart to your written thesis. Your thesis demonstrates your skill at presenting your research in writing. In the viva examination, you will demonstrate your ability to participate in academic discussion with research colleagues.

Purpose of the Exam

The purpose of the viva examination is to:

- demonstrate that the thesis is your own work
- confirm that you understand what you have written and can defend it verbally
- investigate your awareness of where your original work sits in relation to the wider research field
- establish whether the thesis is of sufficiently high standard to merit the award of the degree for which it is submitted

- allow you to clarify and develop the written thesis in response to the examiners' questions

The Examiners and Exam Chair

You will normally have two examiners:

- an internal examiner who will be a member of academic staff of the University, usually from your School/Department but not one of your supervisors
- an external examiner who will normally be a member of academic staff of another institution or occasionally a professional in another field with expertise in your area of research (candidates who are also members of University staff will normally have two external examiners in place of an internal and an external examiner)

Your supervisor should let you know who your examiners will be as it is important that you ensure you are familiar with their work and any particular approach that they may take when examining your thesis.

In some cases there may also be a Chair person for the examination. A Chair is appointed if the Graduate Dean or either of the examiners feels this is appropriate, for example where the examining team has relatively little experience of examining UK research degrees. The Chair is there to ensure the examination is conducted in line with University regulations and is not there to examine your thesis. If there is a Chair person, it will usually be a senior member of the academic staff of your School/Department.

Normally no one else is present in the exam.

Exam Venue and Arrangements

Your internal examiner is responsible for arranging your viva exam and they will contact you with the relevant details - date, time, venue, etc.

Usually the viva exam will take place in your School/Department, though occasionally another University location may be used. If you are unsure where you need to go, make sure you check this before the day of your exam.

If you returned your Notice of Intention to Submit Your Thesis three months before your submission date, your viva exam should normally take place quite soon after submission. Almost

all viva exams take place within three months of thesis submission and in many cases it is within one month.

Format of the Exam

All viva examinations are different, so it is not possible to describe exactly what will happen - but there are general points which can be made which may be helpful, and you should have the opportunity before your examination to discuss what will happen with your supervisor or to attend the University's pre-viva examination workshop.

The purpose of the viva is to establish that your work is of a sufficiently high standard to merit the award of the degree for which it is submitted. In order to be awarded a research degree, the thesis should demonstrate an original contribution to knowledge and contain work which is deemed worthy of publication.

In order to do this, examiners may:

- ask you to justify your arguments
- ask you to justify not only things which you have included in your thesis but also things which you may have left out
- ask you questions about the wider research context in which the work has been undertaken
- argue certain points with you
- expect you to discuss any developments which may flow from your work in the future

Inevitably, your thesis will have strengths and weaknesses and the examiners will want to discuss these. It is considered a positive thing, indeed an essential thing, that you can discuss both the strengths and the weaknesses. You can think of the weaknesses as an opportunity to demonstrate your skill at critical appraisal.

Remember that examiners seek to find and discuss weaknesses in all theses - you should not interpret criticism as an indication that the examination will not end successfully.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Project Part-II **Course Code: EE882**
L-T –P Scheme: 12P **Course Credits: 12**

Project: an activity where the participants have some degree of *choice* in the outcome. The result is complete and functional, that is, it has a beginning, middle and end. Usually, it spans multiple lab periods and requires work outside scheduled lab periods. Since there are choices in implementation, *design* is inherently a component of a project. A project is inherently different from an *analysis* or *exercise*, in which the solution has a predictable form. Projects span a wide variety of possibilities: design and build, identify a system, do a forensic analysis, evaluate a product or assess some environmental situation.

Program Objective 1
Graduates shall make their way to the society with proper scientific and technical knowledge in mechanical engineering.

Program Objective 2
Graduates shall work in design and analysis of mechanical systems with strong fundamentals and methods of synthesis.

Program Objective 3
Graduates shall adapt to the rapidly changing environment in the areas of mechanical engineering and scale new heights in their profession through lifelong learning.

Program Objective 4
Graduates shall excel in career by their ability to work and communicate effectively as a team member and/or leader to complete the task with minimal resources, meeting deadlines.

Program Outcomes:

1. Ability to apply knowledge of mathematics, science and mechanical engineering fundamentals for solving problems.
2. Ability to Identify, formulate and analyze mechanical engineering problems arriving at meaningful conclusions involving mathematical inferences.
3. Ability to design and develop mechanical components and processes to meet desired needs considering public health, safety, cultural, social, and environmental aspects.
4. Ability to understand and investigate complex mechanical engineering problems experimentally.
5. Ability to apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of the limitations.
6. Ability to understand the effect of mechanical engineering solutions on legal, cultural, social, public health and safety aspects./li>

Course Description

7. Ability to develop sustainable solutions and understand their impact on society and environment.
8. Ability to apply ethical principles to engineering practices and professional responsibilities.
9. Ability to function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
10. Ability to comprehend, design documentation, write effective reports, make effective presentations to the engineering community and society at large.
11. Ability to apply knowledge of engineering and management principles to lead teams and manage projects in multidisciplinary environments.
12. Ability to engage in independent and life-long learning in the broad context of technological changes and advancements.