JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

III Year B.Tech EEE II-Sem

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(56009) ELECTRICAL MEASUREMENTS

Objective:
Electrical measurements course introduces the basic principles of all measuring instruments. It also deals with the measurement of RLC parameters voltage, current Power factor, power, energy and magnetic measurements.

UNIT-I: Measuring Instruments
Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – Extension of range of E.S. Voltmeters.

UNIT-II: Instrument transformers
CT and PT – Ratio and phase angle errors – design considerations Type of P.F. Meters – dynamometer and moving iron type – 1-ph and 3-ph meters – Frequency meters – resonance type and Weston type – synchroscopes.

UNIT-III: Measurement of Power
Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems.

UNIT-IV: Measurement of Energy

UNIT - V: Potentiometers
UNIT – VI: Resistance Measurements
Method of measuring low, medium and high resistance – sensitivity of Wheatstone’s bridge – Carey Foster’s bridge, Kelvin’s double bridge for measuring low resistance, measurement of high resistance – loss of charge method.

UNIT – VII: A.C. Bridges

UNIT – VIII: Magnetic Measurements
Ballistic galvanometer – equation of motion – flux meter – constructional details, comparison with ballistic galvanometer.

TEXT BOOK:

REFERENCE BOOKS:
1. Electrical Measurements – by Buckingham and Price, Prentice – Hall
2. Electrical Measurements by Harris.

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(56010) POWER SEMICONDUCTOR DRIVES

Objective:
This course is an extension of Power Electronics applications to AC and DC drives. Control of DC motor drives with single phase and three phase converters and choppers are given in detail. The control of AC motor drives with variable frequency converters and variable voltage are presented.

UNIT – I: Control of DC motors by Single phase Converters
Introduction to Thyristor controlled Drives, Single Phase semi and Fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics Problems on Converter fed d.c motors.

UNIT–II: Control of DC motors by Three phase Converters
Three phase semi and fully controlled converters connected to d.c separately excited and d.c series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

UNIT – III: Four Quadrant operation of DC Drives
Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT–IV: Control of DC motors by Choppers
Single quadrant, Two –quadrant and four quadrant chopper fed d.c separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed d.c Motors – Closed Loop operation ( Block Diagram Only)

UNIT – V: Control of Induction Motor through Stator voltage
Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics.
UNIT – VI : Control of Induction Motor through Stator Frequency
Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters-PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT – VII : Control of Induction motor of Rotor side
Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems

UNIT – VIII : Control of Synchronous Motors

TEXT BOOKS:
2. Power Electronic Circuits, Devices and applications by M.H.Rashid, PHI.

REFERENCE BOOKS:
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI.

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(56011) COMPUTER METHODS IN POWER SYSTEMS

Objective : This course introduces formation of Z bus of a transmission line, power flow studies by various methods. It also deals with short circuit analysis and analysis of power system for steady state and transient stability

UNIT - I : Power System Network Matrices-1
Graph Theory: Definitions, Bus Incidence Matrix, Ybus formation by Direct and Singular Transformation Methods, Numerical Problems.

UNIT - II : Power System Network Matrices-2
Formation of Zbus: Partial network, Algorithm for the Modification of Zbus Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).- Modification of Zbus for the changes in network ( Problems )

UNIT – III : Power flow Studies-1

UNIT – IV : Power flow Studies-2
Newton Raphson Method in Rectangular and Polar Co-Oordinates Form: Load Flow Solution with or without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart.
Decoupled and Fast Decoupled Methods - Comparison of Different Methods – DC load Flow

UNIT – V : Short Circuit Analysis-1
Per-Unit System of Representation, Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems.

UNIT - VI: Short Circuit Analysis-2
Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.

UNIT - VII: Power System Steady State Stability Analysis
Elementary concepts of Steady State, Dynamic and Transient Stabilities.

UNIT - VIII: Power System Transient State Stability Analysis

TEXT BOOKS:

REFERENCE BOOKS:
3. Computer techniques and models in power systems, By K.Uma rao, I.K.International

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(56012) MICROPROCESSORS AND MICROCONTROLLERS
Objective: The objective of this course is to introduce 8085 & 8086 versions of Microprocessor, and their architectural aspects and different components along with microcontroller information.

UNIT-I: 8086 ARCHITECTURE:
Introduction to 8085 microprocessor, 8086 architecture- Functional Diagram, Register Organization,
Memory segmentation, programming model, memory addresses physical memory organization Architecture of 8086, signal descriptions of 8086-common function signals, Minimum and maximum mode signals, Timing diagrams interrupts of 8086.

UNIT-II: Instruction Set and ASSEMBLY LANGUAGE PROGRAMMING OF 8086
Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical branch and cell instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT-III: I/O INTERFACE
8255 PPI, Various modes of operations and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, A/D, D/A Converter Interfacing.

UNIT-IV: INTERFACING WITH ADVANCED DEVICES.
Memory interfacing to 8086 interrupt structure of 8086. Vector interrupt table, interrupt service routine, Introduction to DOS and BIOS interrupts, interfacing interrupt controller 8259 DMA controller 8257 to 8086.

UNIT-V: COMMUNICATION INTERFACE

UNIT-VI: INTRODUCTION TO MICRO CONTROLLERS
Overview of 8051 Micro Controller, Architecture, I/O ports and Memory Organization, Addressing modes and Instruction set of 8051, Simple
Programs.

UNIT-VII: Real time control
Interrupts, Timer/Counter and Serial Communication, Programming Timer
Interrupts, Programming External hardware interrupts, Programming the
serial communication interrupts, Programming 8051 Timers, Counters.

UNIT-VIII: AVR RISC microcontroller architecture
Introduction, AVR family architecture, Register file, ALU, Memory access
and instruction execution I/O memory EEPROM I/O ports, timers, UART,
interrupt structure.

TEXT BOOKS:
   2006
   Edition. 2010

REFERENCE BOOKS:
1. Advanced microprocessors and peripherals A.K. Ray and K M
   Bhurchandani TMH
2. The 8051 micro controllers architecture and programming and
   applications K uma rao Andhe pallavi pearson 2009.
3. Microcomputer Systems: The 8086/8088 Family: Architecture,
   Programming and Design, 2nd ed., Liu & Gibson PHI
4. “Microcontrollers and applications Ajay V. Deshmukh, Tata McGraw-
   Hill Companies – 2005.
5. Microprocessing and interfacing Ramesh Goenkar

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(S6013) RENEWABLE ENERGY SOURCES
(OPEN ELECTIVE)

Objective: It introduces solar energy, its radiation, collection, storage and
application. It also introduces the Wind energy, Biomass energy, Geothermal
energy and ocean energy as alternative energy sources.

UNIT-I: PRINCIPLES OF SOLAR RADIATION:
Role and potential of new and renewable source, the solar energy option,
Environmental impact of solar power, physics of the sun, the solar constant,
extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface,
instrument for measuring solar radiation and sun shine, solar radiation
data.

UNIT-II: SOLAR ENERGY COLLECTION:
Flat plate and concentrating collectors, classification of concentrating
collectors, orientation and thermal analysis, advanced collectors.

UNIT-III: SOLAR ENERGY STORAGE AND APPLICATIONS:
Different methods, Sensible, latent heat and stratified storage, solar ponds.
Solar Applications- solar heating/cooling technique, solar distillation and
drying, photovoltaic energy conversion.

UNIT-IV: WIND ENERGY:
Sources and potentials, horizontal and vertical axis windmills, performance
characteristics, Betz criteria

UNIT-V: BIO-MASS:
Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-
gas digesters, gas yield, combustion characteristics of bio-gas, utilization
for cooking, L.C.Engine operation and economic aspects.

UNIT-VI: GEOTHERMAL ENERGY:
Resources, types of wells, methods of harnessing the energy, potential in
India.

UNIT-VII: OCEAN ENERGY:
OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles.
Tidal and wave energy: Potential and conversion techniques, mini-hydel
power plants, and their economics.

UNIT-VIII: DIRECT ENERGY CONVERSION:
Need for DEC, Carnot cycle, limitations, principles of DEC.

TEXT BOOKS:

REFERENCE BOOKS:
1. Renewable energy resources/ Tiwari and Ghoshal/ Narosa.
2. Renewable Energy Technologies/Ramesh & Kumar/Narosa.
4. Renewable energy sources and emerging technologies by D.P.Kothari, K.C.Singhal, P.H.I.

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(56008) INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE)

UNIT – I
Introduction to Intellectual property; Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II
Trade Marks: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III
Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

UNIT – IV
Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer.

UNIT – V
Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

UNIT – VI
Unfair competition: Misappropriation right of publicity, False advertising.

UNIT – VII
New development of intellectual property: new developments in trade mark law, copy right law, patent law, intellectual property audits.

UNIT – VIII
International overview on intellectual property, international trade mark law, copy right law, international patent law, international development in trade secrets law.

References & Text Books:
1. Intellectual property right, Deborah E. Bouchoux, cengage learning.
Unit-I: Introduction to nanotechnology:
Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nanomaterials, top-down and bottom-up approach to nanostructures.

Unit-II: Quantum Mechanical phenomenon in nanostructures:
Quantum confinement of electrons in semiconductor Nanostructures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

Unit-III: Carbon Nano Structures:
Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

Unit-IV: Fabrication of Nanomaterials:
Physical Methods: Inert gas condensation, Arc discharge, RFplasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

Unit-V: Nano scale characterization techniques:
Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

Unit-VI: Nanodevices and Nanomedicine:
Lab on chip for bioanalysis, Core/shell Nanoparticles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

Unit-VII: Nano and molecular electronics:
Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

Unit-VIII: nanolithography and nanomanipulation:

UNIT-V:

UNIT-VI:

UNIT-VII:
Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules.

UNIT: VIII
TOWARDS SUSTAINABLE FUTURE

SUGGESTED TEXT BOOKS:
1. Environmental studies, From crisis to cure by R. Rajagopalan, 2005

REFERENCE BOOKS:

1. Introduction
The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use ‘good’ English and perform the following:
- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. Objectives:
This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:
- To improve the students’ fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:
The following course content is prescribed for the Advanced Communication
Skills Lab:

- Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- Vocabulary Building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- Reading Comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

4. Minimum Requirement:
The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

ii) The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo – audio & video system and camcorder etc.

System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum
c) Hard Disk – 80 GB
ii) Headphones of High quality

5. Suggested Software:
The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- Clarity Pronunciation Power – part II
- Oxford Advanced Learner’s Compass, 7th Edition
- DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from ‘train2success.com’
  > Preparing for being Interviewed,
  > Positive Thinking,
  > Interviewing Skills,
  > Telephone Skills,
  > Time Management
  > Team Building,
  > Decision making

- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:


DISTRIBUTION AND WEIGHTAGE OF MARKS:
Advanced Communication Skills Lab Practicals:
1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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(56603) POWER ELECTRONICS AND SIMULATION LAB

Any Eight of the Experiments in Power Electronics Lab
1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR’s
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase fully controlled bridge converter with R and RL loads
5. Forced Commutation circuits (Class A, Class B, Class C, Class D & Class E)
6. DC Jones chopper with R and RL Loads
7. Single Phase Parallel, inverter with R and RL loads
8. Single Phase Cycloconverter with R and RL loads
9. Single Phase Half controlled converter with R load
10. Three Phase half controlled bridge converter with R-load
11. Single Phase series inverter with R and RL loads
12. Single Phase Bridge converter with R and RL loads
13. Single Phase dual converter with RL loads

Any two simulation experiments with PSPICE/PSIM
PSPICE simulation of single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads.
PSPICE simulation of resonant pulse commutation circuit and Buck chopper.
PSPICE simulation of single phase Inverter with PWM control.

REFERENCE BOOKS:
2. PSPICE A/D user’s manual – Microsim, USA.
3. PSPICE reference guide – Microsim, USA.
4. MATLAB and its Tool Books user’s manual and – Mathworks, USA.
5. Spice for power electronics and electric power by Rashid , CRC Press