ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRICAL AND ELECTRONICS ENGINEERING

FOR

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for batches admitted from 2010-2011)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA - 533 003, Andhra Pradesh, India

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE

IV YEAR **II SEMISTER**

S. No.	Subject	T	P	Credits
1	Digital Control Systems	4	-	4
2	**Elective – II**	4	-	4
3	**Elective – III**	4	-	4
4	**Elective – IV**	4	-	4
5	Project	-	-	12
	Total			**28**

Elective – II:
1. Advanced Control Systems
2. Extra High Voltage Transmission
3. Special Electrical Machines

Elective – III:
1. Non Conventional Sources of Energy
2. Digital Signal Processing
3. FACTS: Flexible Alternating Current Transmission Systems.

Elective-IV:
1. OOPS through Java
2. UNIX and Shell Programming
3. AI techniques

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

DIGITAL CONTROL SYSTEMS

UNIT – I:
Introduction to signals
Introduction of continuous and discrete time signals, shifting and scaling operator, periodic and nonperiodic signals, linear time invariant and causal systems

UNIT-II:
Introduction to z-transforms
Z-Transform and theorems, finding inverse and method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane.

UNIT-III:
Sampling and reconstruction
Introduction, sampling theorem, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

UNIT – IV:
State space analysis
State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it's Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations

UNIT – V:
Controllability and observability
Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function

UNIT – VI:
Stability analysis
Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant
frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stablility test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT – VII:

Design of discrete time control system by conventional methods

Transient and steady – State response Analysis – Design based on the frequency response method –Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT – VIII:

State feedback controllers and observers

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula.

TEXT BOOK:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition

REFERENCE BOOKS:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control and State Variable Methods by M.Gopal, TMH

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

ADVANCED CONTROL SYSTEMS
(**ELECTIVE – II**)

Objective:
This subject deals with state space, describing function, phase plane and stability analysis including controllability and observability. It also deals with modern control and optimal control systems.

UNIT – I:
State space analysis
State Space Representation, Solution of State Equation, State Transition Matrix, Canonical Forms –Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form.

UNIT – II:
Controllability and observability
Tests for controllability and observability for continuous time systems – Time varying case, minimum energy control, time invariant case, Principle of Duality, Controllability and observability form Jordan canonical form and other canonical forms.

UNIT – III:
Multi input multi output(MIMO) system
Models of MIMO system, matrix representation, transfer function representation, poles and zeros, decoupling, introduction to multi variable Nyquist plot and singular values analysis

UNIT – IV:
Describing function analysis
Introduction to nonlinear systems, Types of nonlinearities, describing functions, Introduction to phase-plane analysis.

UNIT-V:
Stability analysis
Stability in the sense of Lyapunov, Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT – VI:
Modal control
Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement.

UNIT-VII:
Calculus of variations

Minimization of functionals of single function, Constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrangine Equation.

UNIT –VIII:
Optimal control

Linear quadratic optimal regulator (LQR) problem formulation, optimal regulator design by parameter adjustment (Lyapunov method), optimal regulator design by continuous time algebraic riccatti equation (CARE), optimal controller design using LQG framework.

TEXT BOOKS:

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998
2. Automatic Control Systems by B.C. Kuo, Prentice Hall Publication.

REFERENCE BOOKS:

1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition,1996
2. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
3. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies, 1997.
4. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003.
5. Optimal control theory: an Introduction by Donald E.Kirk by Dover publications.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

EXTRA HIGH VOLTAGE TRANSMISSION (Elective-II)

Unit – I:
Preliminaries:
Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius- Examples.

Unit – II:
Voltage gradients of conductors:
Electrostatics – field of sphere gap – field of line changes and properties – charge – potential relations for multi-conductors – surface voltage gradient on conductors – distribution of voltage gradient on subconductors of bundle – Examples.

Unit – III:
Corona effects – I:
Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics - limits and measurements of AN – relation between 1-phase and 3-phase AN levels – Examples.

Unit – IV:
Corona effects – II:
Radio interference (RI) - corona pulses generation, properties, limits – frequency spectrum – modes of propagation – excitation function – measurement of RI, RIV and excitation functions – Examples.

UNIT – V:
Basic Concepts of DC Transmission
Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for VDC Systems – Comparison of AC &DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.

UNIT – VI:
Analysis of HVDC Converters and System Control
Choice of Converter configuration – analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters –Cases of two 3 phase converters in star –star mode – their performance. Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

UNIT-VII:
Reactive Power Control in HVDC

Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies sources of reactive power-AC Filters – shunt capacitors-synchronous condensers.

UNIT – VIII: Harmonics and Filters

Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non-Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics. Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. EHVAC Transmission Engineering by R. D. Begamudre, New Age International (p) Ltd.
2. HVDC Transmission – J.Arrillaga.
3. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.

REFERENCE BOOKS:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar, New Age International (P) Limited, and Publishers.
2. EHVAC and HVDC Transmission Engineering and Practice – S.Rao.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications
4. HVAC and DC Transmission by S. Rao.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

SPECIAL ELECTRICAL MACHINES
(Elective – II)

Unit I:
Switched Reluctance Motor
Principle of operation, design of stator and rotor pole arc, Power Converter for switched reluctance motor.

Unit II:
Stepper Motors
Construction, principle of operation, theory of torque production, hybrid stepping motor, variable reluctance stepping motor.

Unit III:
Brushless DC Motor
Construction, principle of operation, theory of brushless DC Motor as variable speed synchronous motor.

Unit IV:
Linear Induction Motor
Construction, principle of operation, application of linear induction drive for electric traction.

Unit V:
Permanent Magnet Motors
Hysteresis loop, Permanent Magnet DC Motors, equivalent circuit, electrically commutated DC Motor.

Unit VI:
Control of special Machines – I
Stepper motors (open loop control, closed loop control). Characteristics of stepper motor in open-loop drive. Comparison of open loop and closed loop systems.

Unit VII:
Control of special Machines – II
Control of switched reluctance motor for fraction type load. Control of brushless dc motor, rotor position sensing and switching logic for brushless dc motor.

Unit VIII:
Electric Motors for traction drives
AC motors, DC motors, single sided linear induction motor for traction drives, Comparison of AC and DC traction.

TEXT BOOKS:

1. Special electrical Machines, K.Venkata Ratnam, University press, 2009, New Delhi.

2. Brushless Permanent magnet & reluctance motor drives, clarenden press, T.J.E. Miller, 1989, Oxford.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

NON–CONVENTIONAL SOURCES OF ENERGY
(ELECTIVE-III)

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:

Physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II:
Solar Energy Utilization.

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors, solar applications- solar heating/cooling technique, photovoltaic energy conversion.

UNIT-III:
Wind Energy:

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-IV:
Maximum Power Extraction.

Maximum power point tracking for wind and photovoltaic power systems, battery energy storage system.

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, I.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:

Ocean thermal energy conversion, Principles utilization, setting of Ocean thermal energy conversion 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 Direct energy conversion, Carnot cycle, limitations, principles of Direct energy conversion.

Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Non-Conventional Energy Sources /G.D. Rai
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa

REFERENCE BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Solar Energy /Sukhatme/T M H

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

DIGITAL SIGNAL PROCESSING
(Elective – III)

UNIT-I:
Introduction:
Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

UNIT-II:
Discrete Fourier Series:
Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. Relation between Z-transform and DFS

UNIT-III:
Fast Fourier Transforms:
Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N

UNIT-IV:
Realization of Digital Filters:
Review of Z-transforms, Applications of Z – transforms, solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function,

UNIT-V:
IIR Digital Filters:
Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations

UNIT-VI:
FIR Digital Filters:
Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT-VII:
Multirate Digital Signal Processing:
Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

UNIT-VIII:

Introduction to DSP Processors:

Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, multiport memory, VLSI Architecture, Pipelining, Special addressing modes, On-Chip Peripherals. Architecture of TMS 320C5X- Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Registrar, Index Registrar, Auxiliary Register Compare Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, some flags in the status registers, On- chip registers, On-chip peripherals

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Ed., 2006
3. Digital Signal Processing - a computer based approach, TMH, 2001, New Delhi.

REFERENCE BOOKS:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.
4. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.
5. Digital Signal Processors – Architecture, Programming and Applications,, B.Venkataramani, M.Bhaskar, TATA McGraw Hill, 2002.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS (FACTS)
(Elective – III)

Unit-I:
Introduction:
Transmission interconnections, power flow in an AC System, loading capability limits, Power flow and Dynamic stability considerations, importance of controllable parameters.

Unit-II:
Basics of FACTS:
Opportunities for FACTS, basic types of FACTS controllers, benefits from FACTS controllers, Requirements and Characteristics of High Power devices – Voltage and Current rating, losses and speed of switching, parameter trade-off of devices.

Unit-III:
VSC Based Converters:
Basic concept of Voltage source converter, Single phase full wave bridge converter, Single phase-leg (pole) operation, Square-wave voltage harmonics for a single phase Bridge, 3 Phase full wave bridge converter, basic concept of current source converters, comparison of current source converters with voltage source converters.

Unit-IV:
Shunt Converters:
Objectives of shunt compensation, mid-point voltage regulation for line segmentation, End of line voltage support to prevent voltage instability, improvement of transient stability, Power oscillation damping.

Unit-V:
Var Controllers:
Methods of controllable var generation: variable impedance type static var generators – TCR and TSR, TSC, FC-TCR, TSC-TCR, switching converter type var generators, hybrid var generators.

Unit-VI:
Shunt Controllers:
SVC and STATCOM: The regulation and slope transfer function and dynamic performance, transient stability enhancement and power oscillation damping, operating point control and summary of compensation control.

Unit VII:
Series Controllers:

Static series compensators: Concept of series capacitive compensation, improvement of transient stability, power oscillation damping, functional requirements. GTO thyristor controlled series capacitor (GSC), thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor (TCSC), control schemes for GSC, TSSC and TCSC.

Unit-VIII:
Combined Controllers:

UPFC: Basic Operating Principles,
IPFC: Basic Operating Principles and Characteristics

TEXT BOOKS:

1. "Understanding FACTS" N.G.Hingorani and L.Guygi, IEEE Press.
   Indian Edition is available:--Standard Publications, 2001.
2. "Flexible a c transmission system (FACTS)" Edited by YONG HUE SONG and ALLAN T JOHNS, Institution of Electrical Engineers, London.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

OOPS THROUGH JAVA
(Elective IV)

UNIT I: Basics of Object Oriented Programming (OOP):
Need for OO paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

UNIT II: Java Basics:
Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT III: Inheritance:
Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes.

UNIT IV: Packages and Interfaces:
Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT V: Exception handling and Multithreading:
Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT VI: Applets:
Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Applet to applet communication, secure applet

UNIT VII: Event Handling:
Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels,

button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grid bag.

UNIT VIII: Swings:

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java: The complete reference, 7/e, Herbert schildt, TMH.
2. Java: How to Program, 8/e, Dietal, Dietal, PHI

REFERENCE BOOKS:

1. Learn Object Oriented Programming using Java, Venkateswarlu, E V Prasad, S. Chand
2. Programming in Java2, Dr K SomaSundaram, JAICO Publishing house
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

UNIX AND SHELL PROGRAMMING
(Elective IV)

Unit I:

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

Unit II :

Unix Utilities:- Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text processing utilities and backup utilities , detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

Unit III :

Introduction to Shells :

Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command- Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters :

Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

Unit IV :

Grep :

Operation, grep Family, Searching for File Content.

Sed :

Scripts, Operation, Addresses, commands, Applications, grep and sed.

Unit V :

awk:

Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

Unit VI :

Interactive Korn Shell :

Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

Korn Shell Programming :

Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Unit VII :

Interactive C Shell :

C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

C Shell Programming :

Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Unit VIII :

File Management :

File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

TEXT BOOKS :

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition. 2007-2008 Page 34 of 95

REFERENCES :

1. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.
2. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
3. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

AI TECHNIQUES
(Elective IV)

Unit-I:
Introduction to AI techniques
Introduction, Humans and Computers, -knowledge representation-learning process-learning tasks, Methods of AI techniques

Unit-II:
Neural Networks
Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models. Introduction-neural network models-architectures, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

Unit–III:
ANN paradigm
Back propagation-RBF algorithms-Hope field networks.

Unit-IV:Genetic Algorithms
Introduction-encoding-fitness function-reproduction operators

Unit-V:
Genetic Modeling
Genetic operators-cross over and mutation-generational cycle-convergence of genetic algorithm

Unit – VI:
Classical and Fuzzy Sets
Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

Unit-VII:
Fuzzy Logic System Components
Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

Unit-VIII:
Application of AI techniques
load forecasting-load flow studies-economic load dispatch-load frequency control-reactive power control-speed control of dc and ac motors

TEXT BOOK:

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by S.Rajasekaran and G.A. Vijayalakshmi Pai – PHI Publication.
2. Introduction to Artificial Neural Systems - Jacek M. Zurada, Jaico Publishing House, 1997.

REFERENCE BOOK:

1. Neural Networks, Algorithms, Applications and programming Techniques by James A. Freeman, David M. Skapura.
2. Introduction to Neural Networks using MATLAB 6.0 by S N Sivanandam,S Sumathi,S N Deepa TMGH

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electrical and Electronics Engineering – II Sem.

PROJECT