Dr. Babasaheb Ambedkar Technological University, Lonere.

Dr. Babasaheb Ambedkar Technological University

(Established as a University of Technology in the State of Maharashtra)

(under Maharashtra Act No. XXIX of 2014)

P.O. Lonere, Dist. Raigad, Pin 402 103, Maharashtra

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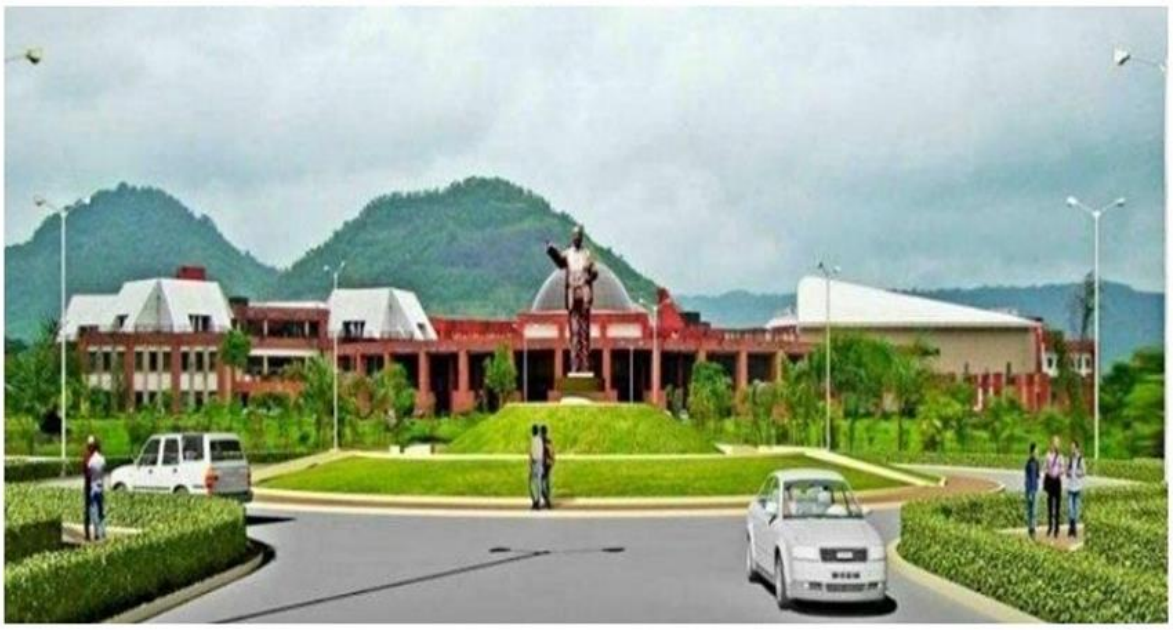
www.dbatu.ac.in

COURSE STRUCTURE AND SYLLABUS

for

Third Year B. Tech. Electrical and Computer Engineering

With effect from the Academic Year 2024-25



Dr. Babasaheb Ambedkar Technological University, Lonere										
B. Tech Electrical and Computer Engineering										
Curriculum of Third Year										
Sem-V										
Course Category	**Course Code**	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				**Credit**
			L	T	P	CA	MSE	ESE	Total	
PCC8	BTECC501	Power System-II	3	-	-	20	20	60	100	3
PEC2	BTECPE502	Group-B	3	-	-	20	20	60	100	3
PCC9	BTECC503	Power Electronics	3	-	-	20	20	60	100	3
PCC10	BTECC504	Microcontroller and Applications	2	-	-	20	20	60	100	2
PCC11	BTECC505	Computer Graphics and Image Processing	3	-	-	20	20	60	100	3
PCC12	BTECC506	Computer Networks	3	1	-	20	20	60	100	4
LC	BTECL507	Power System-II Lab	-	-	2	60	-	40	100	1
LC	BTECL508	Power Electronics Lab	-	-	2	60	-	40	100	1
LC	BTECL509	Programming in Java Lab	1	-	2	60	-	40	100	2
LC	BTECL510	Microcontroller and Applications lab	-	-	2	60	-	40	100	1
Internship	BTECP410	Internship-II Evaluation	-	-	-			50	50	1
			18	1	8	360	120	570	1050	24

BTECPE502	**Group-B (Professional Elective)**
A	Smart Grid Technology
B	Conventional and Renewable Energy
C	HVDC Transmission
D	Industrial Management

Sem-VI										
Course Category	**Course Code**	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				**Credit**
			L	T	P	CA	MSE	ESE	Total	
PCC13	BTECC601	Switchgear and Protection	3	-	-	20	20	60	100	3
PCC14	BTECC602	Electric and Hybrid Vehicles	3	-	-	20	20	60	100	3
PCC15	BTECC603	Control System Engineering	3	1	-	20	20	60	100	4
PCC16	BTECC604	Electronics Communication Systems	3	-	-	20	20	60	100	3
PCC17	BTECC605	Database Management System	3	-	-	20	20	60	100	3
PCC18	BTECC606	Cryptography and Network Security	3	-	-	20	20	60	100	3
LC	BTECL607	Switchgear and Protection Lab	-	-	2	60	-	40	100	1
LC	BTECL608	Database Management System Lab	-	-	2	60	-	40	100	1
LC	BTECL609	Web Development Lab	1	-	2	60	-	40	100	2
Project	BTECM610	Mini Project	-	-	2	60	-	40	100	1
Internship	BTECP611	Internship-III (Minimum of 4 weeks which can be completed partially in 5th or 6th Sem or in at one time)								Credit to be evaluated in 7th Sem
			19	1	8	360	120	520	1000	24

Course with Code: Power System -II (BTECC501)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit 1: Modelling of Power System **(**7 Hours)

Complex power flow, balanced and reactance diagrams of a power system, per unit system per unit representation of transformers, synchronous machines, representation of loads. Graph theory and its applications for formation of primitive network and Z and Y matrices, incidence matrices, Y-bus and Z-bus matrices.

Unit 2: Load Flow Studies **(**7 Hours)

Introduction, network model formulation, formation of Y-bus by singular transformation, load flow problem, Iterative methods of load flow such as Gauss Gauss-Seidel, Newton-Raphson method, decoupled load flow and fast decoupled load flow.

Unit 3: Symmetrical and Unsymmetrical Fault Analysis (10 Hours)

Fundamentals of symmetrical components, sequence impedance and sequence network of star connected loads, transmission lines and transformer sequence network of a loaded generator, Short circuit current computation on no load and on load, selection of circuit breakers, Z-bus formulation, algorithm of short circuit studies. single line to ground (l-g), Line to line (L-L), double line to ground (L-L-G) faults analysis of above faults using bus impedance matrix, bus voltage and line current during faults. open conductor faults

Unit 4 : Power System Stability (10 Hours)

The stability problem-Steady state stability, transient stability and Dynamic stability, Swing equation. Equal area criterion of stability-Applications of Equal area criterion, Step by step solution of swing equation-Factors affecting transient stability, Methods to improve steady state and Transient stability, Elements of an excitation system Types of excitation systems. Control and protective functions of Excitation systems

Unit 5 : Economic Operation of Power System (8 Hours)

Introduction, LFC control of a single-area system, Two-Area Load Frequency Control,

Automatic voltage Control, Speed governing mechanism and its effect on Automatic Generation Control, Load Dispatch centre, Distribution of load between units within a plant, Economic division of load between units in a plant, transmission loss as function of plant generation, calculation of loss-coefficient, numerical Unit Commitment, Constraints on Economic operation of power system

Reference Books

1. P. Kundur, "Power System Stability and Control", McGraw-Hill, 1993.
2. I. J. Nagrath and D. P. Kothari, Modern Power System Analysis, TMH, 2003
3. A Chakrabarti and S. Halder, Power System Analysis: Operation and Control, PHI, 2006.
4. W. D. Stevenson, Elements of Power system analysis, McGraw Hill, Dec., 2007.
5. C.L.Wadhwa, Electrical Power Systems, 3rd Edn, New Age International Pub. Co., 2001
6. T. K. Nagsarkar and M. S. Sukhija, Power System Analysis, Oxford University Press, 2007
7. A.R. Bergen and Vijay Vittal, Power Systems Analysis, Pearson Education Asia, 2001.
8. Stagg W.D. & EI-Abiad A.H., Computer Method in Power System Analysis, McGraw- Hill
9. H. Saadat "Power System analysis", McGraw- Hill
10. Elgred O.I. electrical Energy System Theory", McGraw-Hill.
11. J.D. Glover, M. Sarma and T. J. Overbye, Power System Analysis and Design, Fourth Edition, Thomson Engineering Press, 2008.

Course with Code: Smart Grid Technology (BTECPE502A)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit 1: Introduction to Smart Grid **(**9 Hours)

Introduction, working definitions of Smart Grid, Need of Smart Grid, Present development & International policies in Smart Grid. Introduction to Smart Meters, Real Time Pricing, Smart Appliances, Automatic Meter Reading (AMR), Outage Management System (OMS), Vehicle to Grid, Smart Sensors, Home & Building Automation Smart Substations, Substation Automation, Feeder Automation. Geographic Information System (GIS), Intelligent Electronic Devices (IED) & their application for monitoring & protection, Smart storage like Battery, SMES, Pumped Hydro, Compressed Air Energy Storage, Indian Smart Grid –Key Challenges for Smart Grid. Application and Standards.

Unit 2: Smart Grid Architecture (6 Hours)

Components and Architecture of Smart Grid Design, Review of the proposed architectures for Smart Grid, Transmission Automation, Distribution Automation, Renewable Integration Tools and Techniques for Smart Grid: Computational Techniques, Static and Dynamic Optimization Techniques, Computational Intelligence Techniques, Evolutionary Algorithms, Artificial Intelligence techniques.

Unit 3: Distributed Generation Technologies **(**6 Hours)

Introduction to Renewable Energy Technologies, Micro grids, Electric Vehicles and plug–in hybrids, Environmental impact and Climate Change, Economic Issues

Unit 4: Communication Technologies and Smart Grid (7 Hours)

Introduction to Communication Technology, Advanced Metering Infrastructure (AMI), Home Area Network (HAN), Neighbourhood Area Network (NAN), Wide Area Network (WAN), Bluetooth, ZigBee, GPS, Wi-Fi, Wi-Max communication, Synchro Phasor Measurement Unit (PMU), Wide Area Measurement Systems (WAMS), Two-way Digital Communications Paradigm, Network Architectures, IP based Systems Power Line Communications.

Unit 5: Control of Smart Power Grid System (7 Hours)

Load Frequency Control (LFC) in Micro Grid System, Voltage Control in Micro Grid System, Reactive Power Control in Smart Grid, Case Studies and Test beds for the Smart Grids, Security and Privacy: Cyber Security Challenges in Smart Grid, Load Altering Attacks, False Data Injection Attacks, Défense Mechanisms, Privacy Challenges.

Reference Books

1. James Momoh, ―Smart Grid Fundamentals of Design and Analysis, Wiley, 2012

2. Keyhani, ―Smart Power Grid Renewable Energy Systems, Wiley 2011

3. Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, ―Smart Grid: Technology and Applications, Wiley 2012.

4. Jean Claude Sabonnadiere, Nouredine Hadjsaid, Smart Grids, Wiley ISTE 2012.

Course with Code: Conventional and Renewable Energy (BTECPE502B)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Introduction to Power Generation **(7 hrs)**

Introduction to different sources of energy, environmental aspect of power generation, Economic considerations in power systems-Load and Energy survey, load duration curve, plant factor, and plant economics

Unit II: Thermal and Hydro Power Plants **(7 hrs)**

Thermal Steam and Hydro Power Plants: Selection of site, elements and operational circuits of the power plant, turbo-alternators, plant layout, steam turbines, controls and auxiliaries.

Hydro-electric Power Plants – selection of site, elements of power plant, classification, water turbines, governor action, hydro-electric generator, plant layout, pumped storage plants.

Unit III: Nuclear, Diesel and Gas Power Plant **(7 hrs)**

selection of site, nuclear reaction – fission process and chain reaction, constituents of power plant and layout, nuclear reactor – working, classification, control, shielding and waste disposal.

Diesel and Gas Power Plants: Advantage and limitations, types of diesel plants, general layout, and applications. Components of gas power plant, gas turbine, fuels, materials, working and applications.

Unit IV: Renewable Power Plants **(7 hrs)**

Solar power generation – Photo-voltaic and solar thermal generation – solar concentrators,

Wind power generation – types of wind mills, wind generators, tidal, biomass, geothermal and magneto hydro dynamic power generation, micro-hydel power plants, fuel cells

Unit V: Integration of Renewable Energy Sources **(7 hrs)**

Stand-alone operation of fixed and variable speed wind energy conversion systems and solar system, Grid connection Issues, Grid integrated WECS and solar system

Text Books

1. V. K. Mehta and Rohit Mehta, "Principles of Power System", S Chand Publications.
2. Nag P. K., “Power Plant Engineering”, Tata McGraw Hill Publications.
3. B. R. Gupta, "Power Plant Engineering", Eurasia Publications.

Reference Books

1. Wind Energy Technology - Njenkins, John Wiley & Sons.
2. Solar & Wind energy Technologies - McNeils, Frenkel, Desai, Wiley Eastern.
3. Solar Energy - S.P. Sukhatme, Tata McGraw Hill.
4. R. K. Rajput, “Power Plant Engineering”, Shree Laxmi Publications

Course with Code: HVDC Transmission (BTECPE502C)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I-Introduction to HVDC transmission **(7 hrs)**

Evolution of HVDC Transmission. DC versus AC Transmission, Type of HVDC Transmission systems. DC System components and their functions, Converter configuration, Selection of Converter Configuration, Firing angle, Reactive power control and VAR sources

Unit II: Bridge converters **(7 hrs)**

Rectifier and inverter operation, equivalent circuit representation, power reversal, desired features of control and actual control characteristics.

Unit III: Basic HVDC controllers **(7hrs)**

Converter faults, HVDC system control features, Control Modes, Control Schemes, protection issues in HVDC - DC reactors, voltage and current oscillations, DC circuit breakers and over voltage protection.

Unit IV: Harmonics in HVDC **(7 hrs)**

Characteristics and uncharacteristic harmonics, troubles due to harmonics, harmonic filters – active and passive filters. Introduction to Hybrid HVDC and Off-shore wind power evacuation schemes.

Unit V: Component models for analysis of AC DC system **(6 hrs)**

Power flow analysis Of AC DC system, transient stability analysis, dynamic stability analysis, advances in HVDC Transmission, application in wind power generation.

Reference Books

1.. K. R. Padiyar, HVDC power transmission system, Willey eastern limited, 2nd edition.

2.. E. W. Kimbark, direct current transmission, Wiley- inter science, New York.

Course with Code: Industrial Management (BTECPE502D)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit 1: Principles of Management (8 Hours)

Management, different functions of management: Planning, organizing, Coordination and control. Structure of an industrial organization. Functions of different departments. Relationship between individual Departments. Human and Industrial Relations.

Unit 2: Professional Ethics (6 Hours)

Concept of ethics, Concept of professionalism, Need for professional ethics, Code of professional ethics, Typical problems of professional engineers, Professional bodies and their role.

Unit 3: Motivation and Leadership (6 Hours)

Factors determining motivation, Characteristics of motivation, Methods for improving motivation, Incentives, pay, promotion, rewards. Job satisfaction and job enrichment. Need for leadership, Functions of a leader, Factors for accomplishing effective leadership, Manager as a leader.

Unit 4: Labour, Industrial and Tax Laws (8 Hours)

Importance and necessity of industrial legislation, Types of labour laws and disputes, Brief description of the following Acts: The Factory Act 1948; Payment of Wages Act 1936; Workmen Compensation Act 1923; Industrial Dispute Act 1947; Employee' State Insurance Act, 1948; Provident Fund Act. Various types of Taxes-Production Tax, Local Tax, Sales Tax, Excise Duty, Income Tax. Labour Welfare schemes.

Unit 5: Accidents and Safety (8 Hours)

Classification of accidents, according to nature of injuries i.e. fatal, temporary; according to event and according to place. Causes of accidents-psychological, physiological and other industrial hazards, Effects of accidents, Accidents-prone workers, Action to be taken in case

of accident with machines, electric shock, road accident, fires and erection and construction accidents. Safety consciousness & publicity, Safety procedures. Safety measures-Do's and don'ts & good housekeeping (5S). Safety measures during executions of Electrical Engineering works.

Reference Books

1. Industrial Engineering and Management by TR Banga.
2. Industrial Engineering and Management by OP Khanna, Dhanpat Rai Publications, Delhi.
3. Industrial Management by VK Sharma, OP Harkut.
4. Sharma BR, Environmental and Pollution Awareness: Satya Prakashan, New Delhi.
5. Thakur Kailash, Environment Protection Law & Policy in India: Deep & Deep pub.
6. Handbook of Small-Scale Industry by P.M. Bhandari.
7. Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi
8. Principles of Management by Philip Kotler, TEE Publication.
9. Industrial Organisation and Management by Tara Chand, Nem Chand and Bro., Roorkee

Course with Code: Power Electronics (BTECC503)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Introduction to Power Electronic Switches **(7 hrs)**

Structure, Characteristics, Turn ON methods, Ratings and protection of Power diode, SCR, BJT, Power MOSFET, IGBT, GTO, GaN, SIC devices.

Unit II: AC to DC Rectifiers **(8 hrs)**

Single phase half wave and full wave diode bridge, Three phase half wave and full wave diode bridge, Principle of phase control, Single phase full and semi thyristor converters, three phase full and semi controlled converters, Performance Parameters, commutation methods.

Unit III: Choppers **(7 hrs)**

Principle of chopper operation, Control strategies, Types of chopper circuits, Analysis of buck converter with RLE load, step up converter, buck – boost converter, full bridge DC to DC converter

Unit IV: Inverters **(7 hrs)**

Single phase half bridge and full bridge inverter, three phase six step inverter, 120° mode of conduction, 180° mode of conduction, three phase PWM Inverter, Diode clamped and Cascaded H bridge Multilevel Inverter.

Unit V: Applications **(7 hrs)**

Switched Mode Power Supply (SMPS), UPS, Solar and Wind Energy Sources Integration, Electric Vehicles, Industrial Drives

Text Books

1. M. H. Rashid “Power Electronics, Circuits, Devices and Applications,” Pearson Education Inc., 4th Edition, November 2017.
2. P. S. Bimbhra, “Power Electronics,” 3rd Edition, Khanna Publishers, 2002.
3. P. C. Sen, “Power Electronics”, Tata McGraw hill Publication.

Reference Books

1. B.K. Bose, “Modern Power Electronics and A.C. Drives”, Prentice Hall of India Pvt. Ltd. Publication, 2002.
2. Mohan, Undeland and Robbins, “Power Electronics, Converter Applications and Design”, John Wiley and sons (Asia) Pvt. Ltd., 3rd Edition, 2010.
3. G. K. Dubey and Others “Thyristorised Power Controller”, New Edge International Publishers, 1st Edition Reprint, 2005.

Course with Code: Microcontroller and Applications (BTECC504)	**Semester-V**
Teaching Scheme Theory: 02 hrs/week Credits: 02	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit 1: Introduction to Microcontrollers (4 Hours)

Comparison between microprocessor and microcontroller, Introduction to microcontroller 8051, Architecture of 8051, Pin diagram, Memory Organization- Internal Memory organization, External Memory (ROM & RAM) organisation, special function registers (SFRs), Power control features.

Unit 2: Instruction set and programming (6 Hours)

Addressing modes, Types of Instructions, Instruction set- Data transfer instructions, Arithmetic instructions, Logic instructions, Boolean instructions, branching instructions, simple assembly language programming.

Unit 3: Interfacing of Microcontroller 8051 (5 Hours)

Peripherals and interfacing -Interfacing of 8255, ADC/DAC interfacing, Keyboard & display interfacing, Interface of Multiplexed seven segment LED display, Relay interfacing, Interfacing simple switch and LED, stepper motor interfacing, DC Motor interfacing.

Unit 4: Timers and Serial Port (5 Hours)

Timers and Counters – Timer modes, Operation and Assembly language programming to generate a square wave, 8051 Serial Communication- Basics of Serial Data Communication, RS- 232 standard, 9 pin RS232 signals, Simple Serial Port programming in Assembly

Unit 5: Interrupts and programming (4 Hours)

Interrupt structure, Assembly language programming to generate an external interrupt using a switch, generate a square waveform on a port pin using a Timer interrupt.

Text Books

1. "The 8051 Microcontroller and Embedded Systems – using assembly and C", Muhammad Ali Mazidi, PHI Publication.

2. “The 8051 Microcontroller”, Kenneth J. Ayala, 3rd Edition, Thomson/Cengage Learning Publication.

Reference Books

1. “The 8051 Microcontroller Based Embedded Systems”, Manish K Patel, McGraw Hill Publication,
2. “Microcontrollers: Architecture, Programming, Interfacing and System Design”, Raj Kamal, Pearson Education Publication.

Course with Code: Computer Graphics and Image Processing (BTECC505)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit 1: Overview of Computer graphics systems and Algorithms (7 Hours)

Basics of Computer Graphics and its applications. Video Display devices- Refresh Cathode Ray Tubes, Random Scan Displays and systems, Raster scan displays and random scan displays and systems, Input devices, introduction to three Dimensional display methods, Line drawing algorithms- DDA algorithm, Bresenham's line algorithm, Circle drawing algorithms- Midpoint Circle algorithm, Ellipse drawing algorithms, Midpoint Ellipse algorithm.

Unit 2: Filled Area Primitives and transformations (7 Hours)

Filled Area Primitives- Scan line polygon filling, Boundary filling and flood filling. Two dimensional transformations-Translation, Rotation, Scaling, Reflection and Shearing, Composite transformations, Matrix representations and homogeneous coordinates, Affine transformation, Basics of clipping n viewing.

Unit 3: Fundamentals of Digital Image Processing (7 Hours)

Image processing and applications. Image as 2D data. Image representation in Gray scale, Binary and Colour images. Fundamental steps in image processing. Components of image processing system. Sampling and quantization. Spatial and Gray Level Resolution. Basic relationship between pixels– neighbourhood, adjacency, connectivity. Fundamentals of spatial domain-convolution operation, Colour Image Processing

Unit 4: Image Enhancement in Spatial Domain (7 Hours)

Basic gray level transformation functions - Log transformations, Power-Law transformations, Contrast stretching. Histogram equalization. Basics of spatial filtering - Smoothing spatial filter- Linear and nonlinear filters, and sharpening spatial filters-Gradient and Laplacian

Unit 5: Image Segmentation (7 Hours)

Fundamentals of Image Segmentation. Thresholding - Basics of Intensity thresholding and

Global Thresholding. Region based Approach - Region Growing, Region Splitting and Merging. Edge Detection - Edge Operators- Sobel and Prewitt.

Text Books

1. Donald Hearn and M. Pauline Baker, Computer Graphics, PHI, 2nd edition, 2002.
2. R. C. Gonzalez and R. E. Woods, Digital Image Processing, Pearson, 4th edition, 2017.

Reference Books

1. David F. Rogers, Procedural Elements for Computer Graphics, TMH, 2nd edition, 2001.
2. Z. Xiang, R. Plastock, Computer Graphics (Schaum's Series), McGraw Hill, 2019.
3. M. Sonka, V. Hlavac, and R. Boyle, Image Processing, Analysis, and Machine Vision, Thomson India Edition, 4e, 2017.
4. S. Sridhar, Digital Image Processing, Oxford University Press, 2nd edition, 2016.

Course with Code: Computer Networks (BTECC506)	**Semester-V**
Teaching Scheme Theory: 03 hrs/week Tutorial: 01 hrs/week Credits: 04	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit 1: Introduction **(**7 Hours)

Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, frame relay. THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks, mobile telephone system.

Unit 2: Data Link Layer **(**7 Hours)

Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet. THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wireless LAN, Broadband Wireless, Bluetooth.

Unit 3: NETWORK LAYER (6 Hours)

Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service.

Unit 4: TRANSPORT LAYER (6 Hours)

Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP

Unit 5: APPLICATION LAYER (6 Hours)

Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http. APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.

Text Books

1. A. S. Tanenbaum, Computer Networks, 4th edition, PHI, New Delhi, India.

Reference Books

1. Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India.
2. Kurose, Ross (2010), Computer Networking: A top down approach, Pearson, India.

Course with Code: Power System-II Lab (BTECL507)

Teaching Scheme

Lab: 02 hrs/week

Credits: 01

Minimum Eight Experiments from the following list. (Any Experiment from the following list can be performed either SCILAB/MATLAB/Any Other Software.)

1. Write a program to draw the per unit reactance diagram of a given power system.
2. Solution of building the Bus Admittance matrix for given power system network.
3. Solution of power flow problem of a given power system using Gauss-Siedel method.
4. Solution of power flow problem of a given power system using Newton Raphson Method.
5 Single Line to Ground Fault (L-G) analysis of a Three Phase Transmission Line at no load and light load conditions.
6. Line to Line Fault (L-L) analysis of Three Phase Transmission Line at No load and Light load conditions. 7. Electromagnetic Transients in Power Systems
8. Transient and Small Signal Stability Analysis: Single-Machine Infinite Bus System
9. Load – Frequency Dynamics of Single- Area and Two-Area Power Systems
10. Economic Dispatch in Power Systems.

Course with Code: Power Electronics Lab (BTECL508)

Teaching Scheme

Lab: 02 hrs/week

Credits: 01

Minimum Eight Experiments from the following list.

Minimum five experiments should be on performed on hardware kit and three using any simulation tool.

1) To study VI characteristics of SCR.

2) Any one of the following or both as single practical:

i) To Study VI characteristics of MOSFET.

ii) To Study VI characteristics of IGBT.

3) Any one of the following or both as single practical:

i) To study Single-phase Full-wave Fully controlled Mid-point Converter feeding R and RL load.

ii) To study Single-phase Full-wave Fully controlled Bridge Converter feeding R and RL load.

4) To study Three-phase Full-wave Fully controlled Bridge Converter feeding R and RL Load.

5) Any one of the following or both as single practical:

i) To study Morgan's Chopper.

ii) To study Jones Chopper.

6) Any one of the following or both as single practical:

i) To analyse THD performance of 1-phase fully controlled thyristor bridge rectifier using simulation software.

ii) To analyse THD performance of 3-phase fully controlled thyristor bridge rectifier using simulation software.

7) Any one of the following or both as single practical:

i) To Study simulation of Step-Down Chopper.

ii) To Study simulation of Step-Up Chopper.

8) Any one of the following or both as single practical:

i) To study 120° mode of conduction of 3-Phase Inverter using simulation software.

ii) To study 180° mode of conduction of 3-Phase Inverter using simulation software.

9) To study simulation of 3-Phase PWM Inverter using simulation software.

Course with Code:

Programming in Java Lab (BTECL509)

Teaching Scheme

Theory: 01 hrs/week

Lab: 02 hrs/week

Credits: 02

Course Contents

Unit I: Introduction to Java Applications **(2 hours)**

Introduction, Java Class Libraries, Typical Java Development Environment, Memory Concepts, Arithmetic. Introduction to Classes and Objects: Introduction, Classes, Objects, Methods and Instance Variables, Declaring a Class with a Method and Instantiating an Object of a Class, Declaring a Method, Instance variables, set Methods and get Methods, Primitive Types vs. Reference type double Types, Initializing Objects with Constructors, floating point numbers.

Unit II: Control Statements **(2 hours)**

Control structures if single-selection statement, if….else double-selection statement, while repetition statement, do….while repetition statement, switch multi-selection statement, break and continue statements, logical operators. Methods: Introduction, Program modules in Java, static methods, static Fields and Class Math, declaring methods with multiple parameters, scope of declaration, method overloading and Java API packages.

Unit III: Arrays **(2 hours)**

Arrays, declaring and creating arrays in java, examples using arrays, passing arrays to methods, multidimensional arrays, variable-length argument lists, using command-line arguments.

Unit IV: Inheritance and Polymorphism in Java **(2 hours)**

Inheritance: Super classes and Subclasses, protected members, relationship between super classes and subclasses, constructors in subclasses, object class. Polymorphism: Abstract classes and methods, final methods and classes, polymorphism examples and Interfaces.

Unit V: Exception-handling and Java script **(4 hours)**

Exception-handling overview, handling Arithmetic Exceptions and Input Mismatch Exceptions, when to use exception handling, java exception hierarchy, finally block.

Introduction to Java Applets. Java script: Introduction to client-side scripting, Syntax basics, Operators, Comparisons, Statements, Loops, Events, Objects, and User defined functions, Validations using object functions, Validations using regular expressions, JS document object model, popovers, windows.

Text Book:

1. Paul Deitel and Harvey Detail, Java: How to Program, Pearson's Publication, 9th Edition.

Reference Books:

1. Joel Murach and Michael Urban, Murach's Beginning Java with Eclipse, Murach's Publication, 1st Edition, 2016.
2. Doug Lowe, Java All-in-One for Dummies, Wiley Publication, 4th Edition, 2014.
3. Herbert Schildt, Java The Complete Reference, McGraw-Hill Publication, 9thEdition.
4. Patrick Niemeyer, Daniel Leuck, Learning Java, O'Reilly Media, 4th Edition, 2013.
5. JavaScript: The Good Parts‖, Douglas Crockford, and O'Reilly, ISBN: 9782744055973.
6. Microsoft® .NET: Architecting Applications for the Enterprise, Microsoft Press; 1st edition, ISBN:978-0735626096

List of Experiments:

1. Programs on Operators, Arithmetic Promotion, Method Calling.
2. Programs on Classes: String and Math.
3. Write a program to demonstrate Function overloading.
4. Write a program to demonstrate Constructors of all types.
5. Write a program to demonstrate default parameters, returning by reference.
6. Programs on dealing with Arrays.
7. Programs on Classes: String and Math.
8. Programs on Inheritance and Polymorphism.
9. Programs on Interfaces, block initializers, final Modifier, static and dynamic binding.
10. Programs on Exception Handling.
11. Write a Java program that illustrates the following:

a) Creation of simple package. b) Accessing a package. c) Implementing interfaces.

12. Programs on Java script client-side scripting.

Course with Code: Microcontroller and Applications lab (BTECL510)
Teaching Scheme Lab: 02 hrs/week Credits: 01
Perform minimum eight experiments from following list.
1. Study of architecture of 8051. 2. Addition of two eight-bit numbers. 3. Subtraction of two eight-bit numbers. 4. Multiplication of two eight-bit numbers. 5. Division of two eight-bit numbers. 6. Find largest and smallest number from given series of numbers. 7. Transfer of block of data from source location to destination location. 8. Interfacing of Switch & LED. 9. Interfacing of multiplexed seven segment LED display. 10. Interfacing of Analog to Digital Converter & Digital to Analog Converter. 11. Generate a square wave using timer interrupt. 12. Generate an external interrupt using a switch.

Course with Code: Internship-II Evaluation (BTECP410)
Teaching Scheme Credits: 01
It should be evaluated based on report and completion certificate by the concerned industry/organisation.

Course with Code: Switchgear and Protection (BTECC601)	**Semester-VI**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Fundamentals of Protective Relaying **(7 hours)**

Introduction, need for protective system, types of faults, nature and causes of fault, effects of faults. Classification of relays: Induction type relay, attracted armature relay, Balanced beam relay, zones of protection, primary and backup protection, essential qualities of protective relaying. Trip circuit of circuit breaker, Various basic operating principles of protection- over current, (current graded and time graded), current and time setting in induction relay, Numerical on TSM, PSM and operating time of relay.

Unit II: Circuit Breakers and Fuses **(7 hours)**

Introduction, arcing in circuit breakers, arc interruption, re-striking and recovery voltage, current chopping, resistance switch, Air blast circuit breakers, minimum and bulk oil circuit breakers, SF6 and Vacuum Circuit breakers, HVDC Circuit breakers, Selection of circuit breakers, circuit breakers rating, testing of CB, Definitions of terms in fuses, HRC fuses, fuse characteristics, types of fuses, and application of HRC fuses.

Unit III: Static and Digital Relaying **(7 hours)**

Amplitude and phase comparator techniques, Percentage Differential relays, directional relay, impedance relay, admittance relay, MHO relay, description of numerical relays, Microprocessor Based Relays: overcurrent relays, directional relays, distance relays, Advantages.

Unit IV: Major Equipment Protection **(7 hours)**

Differential protection of alternator, protection of stator: against phases to ground fault, phase to phase faults, inter turn fault, protection against unbalanced loading, protection of rotor against ground fault, field failure, reverse power, back up protection, field suppression, protection of bus bars, frame leakage protection. Differential protection of transformer for different winding configurations, Buchholz relay protection, Standards and specifications

related to switchgear and protection.

Unit V: Transmission Line Protection **(7 hours)**

Over current protection, construction and operation of instantaneous over current relay. Directional Over current relay, unit protection schemes, carrier aided distance protection, Protection of feeders: protection of ring main, radial feeders and parallel feeders, carrier current protection scheme. Protection of induction motor against overload.

Reference Books:

1. S. Rao, "Switchgear Protection and Power Systems", Khanna Publications

2. J Lewis Blackburn, "Protective Relaying- Principles and Applications", Dekker Publications.

3. Badri Ram, D. N. Vishwakarma, "Power System Protection and Switchgear", Tata McGraw Hill Publishing Co. Ltd.

4. J. B. Gupta, "Switchgear and Protection," S.K. Kataria and Sons.

5. Power system protection and switchgear by Oza, Nair, Mehta, Makwana.

6. Power system protection and switchgear, Ravindranath and Chander, TMH

Course with Code: Electric And Hybrid Vehicles (BTECC602)	**Semester-VI**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Electric Vehicles **(8 hours)**

Introduction, EV historical background, Layout of an Electric Vehicle, Performance of Electric Vehicles a) Traction Motor Characteristics b) Tractive Effort and Transmission Requirements c) Vehicle Performance, Energy Consumption, Advantages and Limitations, Specifications, System Components, Environmental importance of EV.

Unit II: Hybrid Vehicles **(7 hours)**

Concepts of Hybrid Electric Drive Train, Architectures of Series Hybrid Electric Drive Trains, Architectures of Parallel Hybrid Electric Drive Trains, Merits and Demerits, Series Hybrid Electric Drive Train Design, Parallel Hybrid Electric Drive Train Design.

Unit III: Fuel Cells & Solar Cars **(6 hours)**

Photovoltaic Cells, Tracking, Efficiency, Solar Cars, Fuel Cells - Construction & Working, Equations, Possible Fuel Sources, Fuel Reformer, Design, Cost Comparison.

Unit IV: Electric Propulsion And Motor Control System **(7 hours)**

DC Motors Characteristics, Speed and Torque Control, Regenerative Braking. AC Motors Characteristics, Speed and Torque Control. PM- BLDC Motors Characteristics, Speed and Torque Control. Reluctance Motors Characteristics, Speed and Torque Control, Regenerative Braking.

Unit V: Energy Storages **(7 hours)**

Electrochemical Batteries: Types of Batteries, Lead-Acid Batteries, Nickel Based Batteries, Lithium Based Batteries, Electro Chemical Reactions, Thermodynamic Voltage, Specific Energy, Specific Power, Energy Efficiency, Ultra Capacitor.

Reference Books:

1. Mehrdad Ehsani, Yimin Gao, Sebatien Gay and Ali Emadi, “Modern Electric, Hybrid Electric and Fuel cell vehicles: Fundamentals, Theory and Design”, CRC Press, 2004.

2. James Larminie and John Loury, “Electric Vehicle Technology – Explained”, John Wiley & Sons Ltd, 2003.
3. Sandeep Dhameja, “Electric Vehicle Battery Systems”, Butterworth – Heinemann, 2002.
4. Ronald K Jurgen, “Electric and Hybrid – Electric Vehicles”, SAE, 2002.
5. Ron Hodkinson and John Fenton, “Light Weight Electric/Hybrid Vehicle Design”, Butterworth – Heinemann, 2001.
6. Iqbal Husain, “Electric and Hybrid Vehicles- Design Fundamentals” CRC Press, 2011.

Course with Code: Control System Engineering (BTECC603)	**Semester-VI**
Teaching Scheme Theory: 03 hrs/week Tutorial: 01 hrs/week Credits: 04	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Introduction to Control System **(8 hours)**

Concept of open & closed loop control system, Linear time invariant system, Transfer Function: Equations of physical systems -Mass-Spring-Dashpot system, R-L-C series & parallel circuit, transfer function, Procedure of obtaining transfer function. Block diagrams: Block diagram representation of system, Block Diagram reduction, and Numerical examples. Signal flow graph: Masons gain formula, overall transfer function of systems by using Masons gain formula.

Unit II: Time Domain Analysis **(6 hours)**

Typical test signals, Time domain specifications, transient response, Steady state response, Types of system, Steady state error and steady state error constants, Numerical examples, Concept of stability, Determination of stability by Routh - Hurwitz criterion.

Unit III: Frequency Domain Analysis **(7 hours)**

Introduction to frequency response, frequency domain analysis, Polar plots, Nyquist plot, Bode plots, Root Locus, Construction of root locus, and Stability from root locus plots, Effect of addition of poles & zeros on root locus plots, Numerical examples.

Unit IV: Controllers and Compensators **(5 hours)**

Controllers: Introduction to Proportional (P), Integral (I) & Derivative (D) controller, composite controllers: PI, PD & PID control and effect on overall system performance, Numerical examples, Compensating networks: Lag compensator, Lead compensator & Lag-Lead compensator.

Unit V: State Variable Technique **(6 hours)**

Concept of state & state variable, State space, Different forms of state variable representations (Phase, physical), Relation between transfer function and state space, Concept of diagonalization, State transition matrix (STM), Methods of finding STM, Power series

method, Laplace transform method, Calay Hamilton method, Controllability & observability of linear system.

Reference Books:

1. 'Modem control Engineering', Ogata K, PHI publication.
2. 'Control System Engineering' Nagarath I. J., Gopal M., New Age Inter. publication
3. 'Control System Engineering', Norman S. Nice, John Wiley & Sons publication
4. 'Control System', Gopal M., PHI publication

Course with Code: Electronics Communication Systems (BTECC604)	**Semester-VI**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Electronic communication system **(7 hrs)**

Definition, Basic block diagram, Need of Modulation, AM and FM technique, AM transmitter, Receiver, FM Transmitter and Receiver, AM and FM Comparison, Noise in AM and FM

Unit II: Pulse Modulation **(7 hrs)**

Definition, advantages over CW modulation, Types of Pulse Modulation, Sampling Theorem, PAM, PWM, PPM Graphical representation, Digital Modulation, PCM System, PCM Transmitter and Receiver

Unit III: Transmission Media **(7 hrs)**

Definition, Types of communication Media, Guided and unguided, Cables, Co axial cables, Fibre optic cable, Infrared, Radio Waves, Microwaves.

Unit IV: Satellite Communication System **(7 hrs)**

Definition, Block diagram, Advantages, Application, Transponder, Earth orbit satellite. LEO, MEO, GEO orbits, Earth Station block diagram and working.

Unit V: Mobile Communication System **(7 hrs)**

Introduction, Limitations of Mobile communication system, Cellular mobile communication Advantages, System architecture, Call processing, Hands Off, mobile handset hardware.

Text Books:

1. Communication Systems Analog and Digital, R. P. Singh, S. D. Sapre Tata McGraw hill.
2. Satellite communication, Dr. D. C. Agarwal, Khanna publications.
3. Mobile Communication, Jochen Schiller, Pearson publications

Reference Books:

1. Electronic Communication System, George Kennedy, McGraw Hill

Course with Code: Database Management System (BTECC605)	**Semester-VI**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Introduction **(7 hours)**

Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture Data modelling using the Entity Relationship Model: ER model concepts, notation for ER diagram, Constraints, keys, E-R Diagrams, Mapping Cardinality, Concepts of Super Key, candidate key, primary key, weak entity sets, Codd‘s rules, Extended ER model, Generalization, Aggregation, , Reduction of an ER diagrams to tables.

Unit II: Relational Data Model, Relational Algebra and Calculus **(7 hours)**

Structure of Relational Databases, Database Schema, Keys Relational algebra: Fundamental Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations. Calculus: Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities.

Unit III: Introduction to SQL **(7 hours)**

Overview of SQL, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operators, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schema, Authorization, Advanced SQL: Assessing SQL from Programming Language, JDBC, ODBC, Embedded SQL, Functions and Procedures, Triggers.

Unit IV: Relational Database Design and File Organization **(7 hours)**

Normalization: Features of good relational designs, Functional dependencies, Normal forms, First, Second, Third normal forms, BCNF, Functional Dependency Theory, Multivalued Dependencies, Fourth Normal Form, Database Design Process. File Organization, Ordered

Indices, B+tree Index files, B Tree Index File, Static Hashing, Dynamic Hashing.

Unit V: Transaction Processing **(7 hours)**

Transaction Concept, A simple Transaction Model, Transaction Atomicity and Durability, Transaction Isolation, ACID Properties, Serializability Concurrency Control Techniques: Lock based Protocols, Deadlock handling, Multiple Granularity, Time stamp-Based Protocols, Recovery System.

Text Book:

1. Henry Korth, Abraham Silberschatz & S. Sudarshan, Database System Concepts, McGraw- Hill Publication, 6th Edition, 2011.

Reference Books:

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems," McGraw-Hill Publication, 3rd Edition, 2003.
2. Joel Murach, Murach's Oracle SQL and PL/SQL for Developers, Mike Murach & Associates, 2nd Edition, 2014.
3. Wiederhold, Database Design, McGraw-Hill Publication, 2nd Edition, 1983.
4. Navathe, Fundamentals of Database System, Addison-Wesley Pub, 6th Edition, 2012.
5. Mark L. Gillenson, Fundamentals of Database Management System, Wiley Publication, 2nd Edition, 2011.
6. Serge Abiteboul, Richard Hull, Victor Vianu, "Foundations of Databases," Reprint by Addison-Wesley.

Course with Code: Cryptography and Network Security (BTECC606)	**Semester-VI**
Teaching Scheme Theory: 03 hrs/week Credits: 03	**Examination Scheme** Mid Semester Exam: 20 Marks Internal Assessment: 20 Marks End Semester Exam: 60 Marks

Course Contents

Unit I: Security and Cryptography Concepts (7 hours)

Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security, Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

Unit II: Key Ciphers (7 hours)

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4. Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

Unit III: Cryptographic Hash Functions and Key Management (6 hours)

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512), Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme. Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure.

Unit IV: Transport-level and Wireless Network Security (6 hours)

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH), Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security.

Unit V: E-Mail Security **(6 hours)**

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations, Internet Key Exchange, Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition.
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: F. Mukhopadhyay, McGraw Hill, 3rd Edition.
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH.
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.

Course with Code: Switchgear and Protection Lab (BTECL607)

Teaching Scheme

Lab: 02 hrs/week

Credits: 01

Perform minimum eight experiments from given list.

Experiments should be performed on hardware kit.

1. To verify the characteristics of Electromechanical type overvoltage relay.
2. To verify the characteristics of Electromechanical type overcurrent relay.
3. To demonstrate working of Electromechanical type directional overcurrent relay.
4. To demonstrate working of Microprocessor based directional overcurrent relay.
5. To demonstrate working of Microprocessor based overcurrent relay.
6. To observe working on Electromechanical type earth fault relay.
7. To observe working on Electromechanical type phase fault relay.
8. To study Protection of three-phase induction motor under different fault conditions.
9. Identify the components of different types of circuit breakers with their specifications (through visits/ videos/models).
10. To verify the characteristics of MCB, ELCB and HRC fuses.

Course with Code: Database Management System Lab (BTECL608)

Teaching Scheme

Lab: 02 hrs/week

Credits: 01

Perform the experiments from following list.

1. Defining schema for applications.
2. Creating tables, Renaming tables, Data constraints (Primary key, foreign key, Not Null), Data insertion into a table.
3. Grouping data, aggregate functions, Oracle functions (mathematical, character functions).
4. Sub-queries, set operations, Joins.
5. Creation of databases, writing SQL and PL/SQL queries to retrieve information from the databases.
6. Assignment on Triggers & Cursors.
7. Normal Forms: First, Second, Third and Boyce Codd Normal Forms.
8. Assignment in Design and Implementation of Database systems or packages for applications such as office automation, hotel management, hospital management.
9. Deployment of Forms, Reports Normalization, Query Processing Algorithms in the above application project.
10. Large objects – CLOB, NCLOB, BLOB and BFILE.
11. Distributed data base Management, creating web-page interfaces for database applications using servlet.

Course with Code:

Web Development Lab (BTECL609)

Teaching Scheme

Theory: 01 hrs/week

Lab: 02 hrs/week

Credits: 02

Course Contents

Unit I: Web Site development Essentials **(2 hours)**

Web Site development Essentials: Overview of Web Design Concepts, Web Project Management Fundamentals, Web Site Development Process, HTML and the Evolution of Markup languages, HTML basic tags, Web Page Layout and Elements, Create Hyperlinks, Create Tables, Create Web Forms, Image Inserting Techniques, Create Frames, GUI HTML Editors, Site Content and Metadata.

Unit II: Cascading Style Sheets **(2 hours)**

Cascading Style Sheets: Cascading Style Sheets for Web page design, Creating CSS rules, Format Text with CSS, Use of CSS Selectors, Embed Style Sheets, and Attach External Style Sheets. Using CSS with Tables: Insert and Styling Tables, Import Table Data, Style Tables with CSS, Sort Data in Table.

Unit III: Programming fundamentals **(2 hours)**

Introduction to JavaScript, Variables, Basic in JavaScript — Numbers and operators, Handling text — Strings in JavaScript, Useful string methods, Arrays, Troubleshooting JavaScript; Programming fundamentals: If...Else Statements, Else...If Statements, For Loops, While Loops, Breaking Out Of Loops, Switch Statements, Functions; JavaScript Events, Selecting HTML elements using get Element ById().

Unit IV: PHP **(2 hours)**

PHP: Basic Syntax, defining variable and constant, PHP Data type, Operator and Expression, Handling Html Form with PHP: Capturing Form Data, Dealing with Multi-value filed, redirecting a form after submission, PHP Session.

Unit V: Introduction to JQuery and AJAX **(2 hours)**

JQuery: Introduction to JQuery, Validation using JQuery, JQuery Forms, JQuery Examples, AJAX: Introduction to AJAX, PHP with AJAX Introduction to RDBMS: Connection with MySQL Database, Performing basic database operation (DML)(Insert, Delete, Update, Select)

Text Book:

1. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, Ajax, PHP and jQuery, 2ed (English, Paperback, DT Editorial Services).

Reference Books:

1. Robin Nixon, Learning PHP, MySQL & JavaScript with j Query, CSS & HTML5, Paperback by Orielly Pub.

2. E. Robson, E. Freeman, Head First HTML & CSS, O'Reilly Media, 2nd Edition, 2012.

List of Experiments:

1. Design an html form for displaying information using interactive css including images, tables.
2. Create a webpage with HTML describing your department with following specification:

a. Change the background colour of the page. At the bottom create a link to take user to the top of the page.

b. Insert an image and create a link such that clicking on image takes user to other page.

c. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags.

3. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.
4. Write a JavaScript to validate the following fields of employee on html form: email, name, mobile no., address, salary.
5. Develop and demonstrate a HTML file that includes JavaScript script that uses functions for the following problems:

a. Parameter: A string

Output: Length of the String

b. Parameter: A number

Output: The number with its digits in the reverse order

6. Develop and demonstrate a HTML file that includes JavaScript for the following problems:

a. Input: A starting and ending number

b. Output: find all the prime numbers between starting and ending number.

7. Write a PHP program to display a digital clock which displays the current time of the server.

8. Write a PHP program to implement sign-In and Sign-out functionality.
9. Write a PHP program to keep track of the number of visitors visiting the Web page and to display this count of visitors, with proper headings.
10. Write a PHP code to implement AJAX functionality.
11. Write a PHP program to perform search operation on the student records using AJAX.
12. Write a PHP program to sort the student records which are stored in the database using ascending/descending order.

Course with Code: Mini Project (BTECM610)		
Teaching Scheme Lab: 02 hrs/week Credits: 01		
Guidelines		
Stages	**Work to be carried**	**Time**
I	Selection of a mini viable project idea (Hardware or Software Based or both) on recent trends in Electrical and Computer Engineering.	4 Hours
II	Study various resources in electrical and computer engineering.	4 Hours
III	➢ Study of Circuit Diagram and preparation of algorithm. ➢ Study various software/and application software in building of project like SCILAB, MATLAB, Python, Jawa, HTML etc.	6 Hours
IV	➢ Selection of micro-controller, Design of hardware for selected Project. ➢ Interfacing of hardware, Testing and implementation of software.	6 Hours
V	➢ Verification of the results obtained of the working model or software. ➢ Compare with desired results and take corrective action.	4 Hours
VI	Completion of project by developing the Project Report and submitting the report to the concerned to receive the final credits.	4 Hours