PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Bachelor of Technology**   Semester –VI

Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External**	**Internal**	**Total**
BT-16101	**Ethical Hacking & Cyber Security**	**3**	**1**	-			Min: 40 (D Grade	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test-- Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment/ Quiz/Attendance Max. Marks: Nil

Pre-Requisite	Student should have basic knowledge of computer.
Course Outcome	1. Identify and analyze the stages an ethical hacker requires to take in order to compromise a target system.
	2. To identify tool and techniques to carry out a penetration testing.

Unit	Contents (*Theory*)	Marks Weightage
I	**Introduction**: Understanding the importance of security, Concept of ethical hacking and essential Terminologies-Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit. Phases involved in hacking, **Foot printing:** Introduction to foot printing, Understanding the information gathering methodology of the hackers, Tools used for the reconnaissance phase.	**14**
II	**System-Hacking**-Aspect of remote password-guessing Role of-eavesdropping, Various methods of password cracking, Keystroke Loggers, Understanding Sniffers, Comprehending Active and Passive Sniffing, ARP Spoofing and Redirection, DNS and IP Sniffing, HTTPS Sniffing.	**14**
III	**Hacking Wireless Networks:** Introduction to 802.1I,Role of WE?, Cracking WEP Keys, Sniffing Traffic, Wireless DOS attacks, WLAN Scanners, WLAN Sniffers, Hacking Tools, Securing Wireless Networks.	**14**
IV	**Introduction to Cybercrime:** Defining Cybercrime, Understanding the Importance of Jurisdictional Issues, Quantifying Cybercrime, Differentiating Crimes That Use the Net from Crimes That Depend on the Net, working toward a Standard Definition of Cybercrime, Categorizing Cybercrime, Developing Categories of Cybercrimes, Prioritizing Cybercrime Enforcement, Reasons for Cybercrimes.	**14**
V	**Introduction to Cybercrime:** Defining Cybercrime, Understanding the Importance of Jurisdictional Issues, Quantifying Cybercrime, Differentiating Crimes That Use the Net from Crimes That Depend on the Net, working toward a Standard Definition of Cybercrime, Categorizing Cybercrime, Developing Categories of Cybercrimes, Prioritizing Cybercrime Enforcement, Reasons for Cybercrimes.	**14**

Text Book/References Books/ Websites
1. Aare, LuniverPress; NetworkSecurity; Ethical Hacking Rajat. 30-Nor-2006
2. Thomas Mathew ;Ethical !lacking;0571 Publisher, 28-Nor-2003

Suggested List of Laboratory Experiments :-Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External**	**Internal**	**Total**
BT-16103	**Human Resource Management**	**3**	**1**	**-**			Min: 40 (D Grade	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test-- Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment/ Quiz/Attendance Max. Marks: Nil

Pre-Requisite	Student should have basic knowledge of computer.
Course Outcome	1. The objective of the course is to equip students with various human resource management concepts and current practices in managing human resources in knowledge based environment.

Unit	Contents (*Theory*)	Marks Weightage
I	**Introduction to Human Resource Management:** Definition and Concept, Features, Objectives, Functions, Scope and Development of Human Resource Management, Importance of Human Resource Management, Human Resource Planning.	**14**
II	**Job Analysis and Design:** Job Analysis, Job Description, Job Specification, Job Design, Recruitment, Selection.	**14**
III	**Induction Programme:** Contents, Need for Induction. **Training**: Concept and Significance of Training, Training Needs, Training Methods, Types of Training.	**14**
IV	**Performance Appraisal:** Concept of Performance Appraisal, Purpose of performance appraisal, Process, Methods of Performance Appraisal, Major Issues in Performance Appraisal.	**14**
V	**Industrial Relation & Trade Unions:** Employee welfare, Employees Empowerment, Grievance procedure ,Collective Bargaining, Settlement of Disputes, Human Resource Accounting, Separation, Retirement Schemes, Resignation, Suspension, Layoff.	**14**

Text Book/References Books/ Websites:

1. Gupta & Joshi, 'Human Resource Management', Kalyani Publication, 2nd Edition 2004.
2. Rao VSP, Human Resource Management, Excel Books, New Delhi2005.
3. Aswathappa, K. 'Human Resource and Personnel Management', Tata McGraw-Hill, 1997.
4. Gupta, P.K., Human Resource Management, Dreamtech Press, 2011.
5. Mamoria C.B., 'Personnel Management', Himalaya Pub. House.6. Khanka S.S, 'Human Resource Management' S.Chand, New Delhi,2009.
6. Dessler Gary, 'Human Resource Management', PHI, New Delhi,10th Edition, 2005.
7. Bhattacharya D.K. Human Resource Management, Excel Books, New Delhi, 2006.

Suggested List of Laboratory Experiments :-Nil

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Programme: **Bachelor of Technology**   **Semester –VI**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External	Internal	Total
EET-1602	Utilization of Electrical Power	3	1	-	External (70)	Internal (30)	Min: 40 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks:-20	Assignment/Quiz/Attendance- Max. Marks:-10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks:- Nil	Assignment / Quiz/Attendance - Max. Marks:-Nil

Pre-Requisite	Basic knowledge of utilization techniques of electrical power.
Course Outcome	1. Method of Electrical heating and Electric welding.
	2. Illumination process and calculation of lumens efficiency.
	3. Application of electrolytic process and manufactures of chemicals.

Unit	Contents (Theory)	Marks Weightage
I	**Electric Heating**: Different methods of electric heating. Principle of high frequency induction and di-electric heating. Construction, operation, performance and applications of arc furnace and induction furnace. **(ii) Electric Welding:** Welding process, welding transformer, Classification of Electric Welding: arc welding, resistance welding, welding of various metals.	14
II	**Illuminations**: Definitions, laws of illuminations, polar curves, luminous efficiency, Photometer, incandescent lamps: filament materials, halogen lamp. Electric discharge lamps: sodium vapour lamp mercury vapour lamp and fluorescent lamp. Light Calculations: commercial, industrial, street and flood lighting.	14
III	**Electrolytic Process**: Principles and applications of electrolysis, electro-deposition, manufactures of chemicals, anodizing, electro polishing electro-cleaning, electroextraction, electrorefing, electro-stripping (parting) power supplies for electrolytic process.	14
IV	**Electric Traction & Means of Supplying Power**: Systems of Electric Traction: DC & AC Systems, Power Supply for Electric Traction System: Comparison and application of different systems. Sub-station equipment and layout, conductor rail & pantograph.	14
V	**Traction Methods**: Types of services, speed time and speed distance curves, estimation of power and energy requirements, Mechanics of train movement. Co-efficient of adhesion, Adhesive weight, effective weight. Traction Motor Controls: DC and AC traction motors, Series parallel starting. Methods of electric braking of traction motors.	14

Text Book/References Books/ Websites

1. H. Partab; "Art & Science of Utilisation of Electrical Energy"; Dhanpat Rai & Sons.
2. G.W. Vinal; "Storage Batteries"; John Wiley & Sons Inc.
3. N. Mohan, "T.M. Undeland & W.P. Robbins"; Power Electronics; John Wiley & Sons.
4. P.C. Sen; "Power Electronics"; Tata McGraw-Hill Publishing Co. Ltd.
5. P.C. Sen; "Modern Power Electronics"; Wheeler Publishing.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (35)	Internal (15)	Total (50) Min: 20 (D Grade)
EET-1603	Switchgear and Protection	3	1	1						

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks:-20	Assignment/Quiz/Attendance- Max. Marks:-10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Knowledge of the Electrical Power System operation and basic terminologies.	
Course Outcome	1.	Understanding various faults and their affects in the power system.
	2.	Knowledge about the various types of Relays and their working.
	3.	Knowledge about the various types of Circuit Breakers and their working.

Unit	Contents (Theory)	Marks Weightage
I	**Fault Analysis:** Fault Analysis per unit, representation and its advantages, faults in power systems (Symmetrical & Unsymmetrical), Single line and equivalent impendence diagram Representation of power system components. Symmetrical components and its application to power systems, fault analysis, Sequence networks and their interconnection for different types of faults, Effect of fault impedance, Current Limiting reactors, its location and application, Short circuit calculation.	14
II	**Proactive Relays:** Requirement of relays, Primary & backup protection, Desirable qualities of relays, Concept of Pickup, reset & drop-off, Drop off/ Pickup ratio, inverse time & definite time charters tics, Attracted armature, Balanced Beam, Induction disc, Induction cup, Moving coil & moving Iron, Rectifier, Thermal, and Bimetal directional relay, Frequency, DC, all or nothing relays. Pilot & negative sequence, Over current, Over Voltage, Directional, Differential and Distance relays, R-X diagram, Impedance mho & reactance relay. Introduction of static analog & digital relays, Classification of static relays.	14
III	**Circuit Breakers:** Elementary principle of arc quenching, recovery & re-striking voltage, arc quenching Devices, description and operation of Bulk oil, Minimum oil, Air break, Air blast, SF6, Vacuum circuit breakers and DC circuit breakers, their comparative merits, LT Switch gear, HRC fuses, current limiting reactor & influence of reactors in CB ratings, Testing of circuit breaker.	14
IV	**System Protection:** Protection of Generators - Earth Fault, percentage, differential, Loss of excitation, Prime mover failure, over current, Turn to turn fault, Negative phase sequence, Heating, Reverse power protection schemes. Protection of Transformers: Internal & external fault protection, Differential, Earth fault, Over Current, Overheating, Protection schemes, Protection of transmission lines, Over current, Distance and carrier current protection schemes.	14
V	**Surge Protection & Insulation Co-Ordination:** Switching surges, Phenomena of Lightning, over voltage due to lightning, Protection against lightning, Lightning arrestors, selection of lightning arrestors, Surge absorbers and diverters, Rod gap, Horn gap expulsion type & valve type lightning arrestors, Solid resistance and reactance earthling, Arc suppression coil, earthling transformers, Earth wires, Earthing of appliances, insulation co-ordination, Definitions determination of line insulation, insulation level of substation equipment, coordination Amongst items of substation equipment.	14

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Text Book/References Books/ Websites

1. B. Ravindran and M Chander; "Power System protection and Switchgear" New Age International.
2. Badrirka; "Power System protection and switchgear"; TMH.
3. CL Wadhwa; "Electrical Power systems"; New age International.
4. Haddi Saade;, "Power System Analysis" ; TMH.
5. A.R. Bergen, Vijay Vittal; "Power System Analysis"; Pearson Education, Asia.
6. Sunil S. Rao; "Switchgear & protection"; Khanna Publication.

Suggested List of Laboratory Experiments :- (Expandable):

1. To identify the Components of different types of circuit breakers with their specifications.
2. To study different switchgear equipments used in electrical power system.
3. To study the Minimum Oil Circuit Breaker [MOCB] for the Protection.
4. To Study the Buchholz relays for protection in system with its operation.
5. Operating Characteristics of Over Voltage Relays.
6. Operating Characteristics of IDMT Relays.
7. Operating Characteristics of Percentage based differential relays.
8. Operating Characteristics of Determination of instantaneous relays.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External (35)**	**Internal (15)**	**Total (50)**
EET-1604	**Power Electronics**	3	1	1	**External (70)**	**Internal (30)**	Min: 40 (D Grade)	**External (35)**	**Internal (15)**	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks:-20	Assignment/Quiz/Attendance Max. Marks:-10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Knowledge of the Basic Electrical and Electronics Engineering.	
Course Outcome	1.	Choose the appropriate converter for various applications.
	2.	Design the power converters suitable for particular applications.
	3.	Develop the novel control methodologies for better performance.

Unit	Contents (Theory)	Marks Weightage
I	Advantages and application of power electronic devices characteristics, Symbol & application of power diodes, power transistors, GTO, Triac, Diac, Power MOSFET, IGBT, LASCR, Fast recovery diode, schottey diode MCTs. Principle of operation of SCR, Two transistor analogy, brief idea of construction of SCR, Static characteristics of SCR, Condition of turn on & off of SCR Gate characteristics, Method for turning on of SCR, Turnoff methods, different commutation techniques (Class A,B,C,D,E, & F Commutation) firing of SCR, Use of pubic transformer and isolator in firing, Resistance firing Ckt, Resistance capacitance firing circuit, UJT firing cut, and ramp triggering, firing for 3-Φ circuit. SCR rating & protection of SCR over voltage, Over current, Suprior firing, Design of snubber circuit and protection of gate of SCR, heating, cooling & mounting of SCR series and parallel operation of SCR, String efficiency & problem associated with series and parallel operation of SCR.	**14**
II	Operation and analysis of single phase (Half wave & Full Wave) and multiphase (Three Phase) uncontrolled and controlled rectifier circuit with resistive, resistive & inductive load (continuous & non continuous conduction, Fw small & very large inductive loads) and RLE loads. Estimation of best load voltage and load current for above rectifier circuits active and reactive power input. Effect of freewheeling diode and source inductance on performance of these rectifier circuits. Comparison of Mid Point & Bridge rectifier circuits.	**14**
III	Series and parallel inverter, Voltage source & current source inverter, Single phase and three phase bridge inverter, Self cumulated inverters, MC- Murray & MC-Murray Bed ford inverters, Voltage control of single phase and three phase bridge inverter, Harmonics & their reduction techniques.	**14**
IV	Principle of chopper operation, Various control strategies in chopper, Step up & step-up/step down choppers, chopper configuration (Type A,B, C,D, & E), Steady state analysis of chopper circuits, Current & voltage commutation of chopper circuits Jones & Morgens chopper.	**14**
V	Single phase (Mid Point & bridge configuration) and three phase cyclo convertor configuration and operating principles. AC voltage controllers (using SCRs & Traics) single phase full wave controller with R and RL load, Estimation of RMS load voltage, RMS load current and input power factor, three phase AC voltage controller (Without analysis) Dual converter Switched mode voltage regulator buck, Boost, Buch & Boost, Ck regulators.	**14**

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Text Book/References Books/ Websites
1. M.H. Rashid, Power Electronics Circuits; "Devices and Applications, Pearson Education, Singapore".
2. M Ramsmoorthy; "An Introduction to transistor and their application"; Affiliated East-West Press.
3. P.C. Sen; "Power Electonics"; TMH.
4. M.D. Singh, K.B. Khanchandani; "Power Electronics"; TMH, Delhi.
5. Chakravarti A.; "Fundamental of Power Electronics and Drives"; Dhanpat Ray & Co.
6. Dr. P.S. Bhimbhra, Power Electonics, Khanna Pub.
7. Vedam Subramanyam; "Power Electronics"; New Age International Revised II ed.
8. Randall Shaffer; "Fundaments of Power Electronics With MATLAB"; Cengage Leaening.

Suggested List of Laboratory Experiments :- (Expandable):

1. To plot the V-I characteristics of the SCR.
2. To draw V-I characteristics of Triac.
3. Study of SCR triggering circuits and check the performance of UJT as triggering device.
4. Study of SCR commutation circuits and check the performance of one commutation circuit.
5. Study of Jones chopper or any chopper circuit to check the performance.
6. Thyristorised speed control of a D.C. Motor.
7. Speed Control of induction motor using Thyristor.
8. Study of series inverter and Mc Murray half-bridge inverter and check their performance.
9. Study of the microprocessor based firing control of a bridge converter.
10. Design and simulation of following Thyristor circuits using PSCAD / MATLAB software.
    a) Commutation,
    b) Chopper,
    c) Investors,
    d) Rectifier,
    e) UJT as triggering circuit,
    f) Speed control of motors.

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Programme: **Bachelor of Technology**   **Semester –VI**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)** Min: 40 (D Grade)	**External (35)**	**Internal (15)**	**Total (50)** Min: 20 (D Grade)
EET-1605	**Electronic Instrumentation & Measurement**	3	1	1						

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks:- 20	Assignment/Quiz/Attendance- Max. Marks:- 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Knowledge of Electrical Instrumentation and basic Electronics.
Course Outcome	1. Knowledge of various Electronic devices and their applications.
	2. Measure various electrical parameters with accuracy, precision, resolution.
	3. Use AC and DC bridges for relevant parameter measurement.

Unit	Contents (Theory)	Marks Weightage
I	Introduction to CRO, Different parts of CRO, Its Block diagram, Electrostatic focusing, Electrostatic deflection, post deflection acceleration, Screen for CRTs, Graticule, Vertical & Horizontal deflection system, Time base circuit, Oscilloscope probes and transducers, Attenuators, Application of CROs, Lissajous patterns, Special purpose CROs- Multi input, Dual trace, Dual beam, Sampling, Storage (Analog & Digital) Oscilloscopes.	**14**
II	A.C. Bridge Measurement Sources and detectors, Use of Bridges for measurement of inductance, Capacitance & Q factor Maxwells bridge, Maxwells inductance capacitance bridge, Hays bridge, Andersons bridge, Owen's Bridge, De-sauty's Bridge, Schering Bridge, High Voltage Schering bridge Measurement of relative permittivity, Heaviside cambell's bridge, Weins bridge, Universal bridge, Sources of errors in Bridge circuit, Wagner's Earthing device, Q meter and its applications and measurement methods	**14**
III	Transducers: Transducers definition and classification, mechanical devices as primary detectors, Characteristic & choice of Transducers, Resistive inductive and capacitive transducers, strain gauge and gauge factor, Thermistor, Thermo couples, LVDT, RVDT, Synchros, Piezo-Electric transducers, Magnet elastic and magnetostrictive Hall effect transducers, Opto-electronic transducers such as photo voltaic Photo conductive, photo diode and photo conductive cells, Photo transistors, Photo optic transducers. Introduction to analog & Digital data acquisition systems-Instrumentation systems used, Interfacing transducers to electronic control & measuring systems Multiplexing - D/A multiplexing A-D Multiplexing, Special encoders. Digital control description	**14**
IV	Signal Generators Fixed & variable frequency AF oscillators, Sine wave generators, Standard signal generator, AF Sine and Square wave generator Function generator, Square and pulse generator, Random noise generator, Sweep generator, TV Sweep generator, Marker generator, Sweep- Marker generator Wobblyscope, Video pattern generator Vectroscope, Beat frequency oscillator, Wave analyzer: Basic wave analyzer, Frequency selective wave analyzer, Heterodyne wave analyzer, Harmonic distortion, analyzer, spectrum analyzer digital Fourier analyzer.	**14**

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V	Digital Instruments Advantages of Digital instruments over analog instruments, resolution and sensitivity of Digital meters., Digital Voltmeter - Ramp type, Dual slope integration type, Integrating type, Successive approximation type, Continuous balance DVM or Servo balancing potentiometer, compression of Electronic & Digital Volt meter, Digital Multimeter, Digital frequency meter, Time period measurement High frequency measurement, Electronic counter, Digital tachometer, Digital PH meter, Digital phase meter, Digital capacitance meter. Digital display system and indicators like CRT, LED, LCD, Nixies, Electro luminescent, Incandescent, Electrophoretic image display, Liquid vapour display dot-matrix display, Analog recorders, X-Y recorders. Instruments used in computer-controlled instrumentation RS 232C and IEEE 488, GPIB electric interface	**14**

Text Book/References Books/ Websites

1. Albert D.Helfrick,W.D.Cooper; "Modern Electronic Instrumentation and measurement techniques"; PHI.
2. H.S. Kalsi; "Electronic Instrumentation"; TMH.
3. A.K. Sawhney; "Electrical and Electronic measurements and Instrumentation"; Dhanpat Rai and Co.
4. E.W. Golding; "Electrical Measurement and Measuring Instruments"; Sir Isaac Pitman and Sons, Ltd.London.
5. C.S. Rangan,G.R. Sarma,V.S.V. Mani; "Instrumentation Devices and Systems"; Tata McGraw-Hill Publishing Company Ltd.
6. B.C. Nakra, K.K. Choudhry; "Instrumentation, Measurement and Analysis"; Tata McGraw-Hill Publishing CompanyLtd.
7. Morris A.S.; "Principles of Measurement & Instrumentation"; PHI.
8. Murthy BVS; "Transducers and Instrumentation"; PHI.

Suggested List of Laboratory Experiments :- (Expandable):

1. Measurement of inductance of a coil using Anderson Bridge.
2. Measurement of capacitance of a capacitor using Schering Bridge.
3. LVDT and capacitance transducers characteristics and calibration.
4. Resistance strain gauge- Strain Measurement and calibration.
5. Measurement of R, L, C & Q using LCR-Q meter.
6. Study & measurement of frequency using Lissajous patterns.
7. Measurement of pressure using pressure sensor.
8. Study of Piezo-electric Transducer and Measurement of impact using Piezo-electric Transducer.
9. Measurement of Displacement using LVDT.
10. Measurement of speed of a Motor using photoelectric transducer.
11. Study & Measurement using ph meter.
12. Temperature measurement & Control using thermo couple & using thermistor.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total	External (35)	Internal (15)	Total (50)
EET-1606	Electrical Engineering Simulation Lab	-	-	1	External (Nil)	Internal (Nil)	Nil	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks:-Nil	Assignment/Quiz/Attendance-Max. Marks:-Nil
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Nil	
Course Outcome	1.	Fundamentals on all the basics of Simulation and Modeling.
	2.	Programming concepts in MATLAB.
	3.	Creating and Simulating a SIMULINK Model.

Unit	Contents (Theory)	Marks Weightage
I	Simulation Mechanism and Simulation Tools, Starting and Ending MATLAB, MATLAB Desktop, Help Browser, Types of Files, Command Input Assistance, Operators and Special Characters, Variables and Arrays, Handling Arrays, Useful Built-in Functions, Control Structures, Input/Output Commands, File Handling	10
II	Introduction to Plotting ,The plot command, Formatting and Labeling a Plot, Multiple Plots, Adding Legend, Sub Plots, Plotting Complex Data, 2-D and 3-D Plots, Plotting a Function, Plot Editor, Interactive Plotting using Plotting Tool.	10
III	Programming in MATLAB, MATLAB Editor, MATLAB Programming, Debugging MATLAB Programs, MATLAB Debugger, Functions and Function Files, Differential Equation Solver, Symbolic Mathematics, Programming.	10
IV	Basic Electrical and Networks,Applications Analysis of Electrical Networks – Experiments based on Solution of Series-Parallel Circuits, Solution of system with linear equations – Experiments based on mesh and nodal analysis, Experiments for Validation of Network Theorems, Solution of Network Problems, Solution of First Order Differential Equation – Experiments for the study of Transients, Experiments for AC Signal Waveform Analysis, Study of Resonance in AC Circuit, Study of Frequency Response Waveform Analysis, Study of Resonance in AC Circuit, Study of Frequency Response.	10
V	System Modeling using SIMULINK Simulation Steps, Getting SIMULINK, Creating and Simulating a SIMULINK Model, SIMULINK Solution of Differential Equation, Assigning Variables, Observing Variables During Simulation, Storing/Saving Data, Linking M-file with Model file, Creating and Masking Sub-systems, Solution using Laplace Transform Approach, Solution using Laplace Transform Approach, Study of dynamic response, Simulation of Non-Linear System, Examples such as SIMULINK model to generate sine, cosine waveform and ramp signal	10

Text Book/References Books/ Websites

1. Dr Shailendra Jain; "Modelling and Simulation Using MATLAB-SIMULINK"; willey india.
2. Rudraprasad; "MATLAB Programming".

Suggested List of Laboratory Experiments :- (Expandable): Nil.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (Nil)**	**Internal (Nil)**	**Total**	**External (Nil)**	**Internal (50)**	**Total (50)**
BT-1607	**Research Methodology**	**-**	**-**	**1**			Nil			Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 50	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: 50

Pre-Requisite	**Nil**
Course Outcome	1. To study about different types of research, its motivation and objectives.
	2. To give the knowledge of basic principles need for research design and features of good design.
	3. To give the knowledge of writing and reporting of the thesis of given research report.

Unit	Contents (Theory)	Marks Weightage
I	**Research Methodology:** Meaning, Objective & its types, Research approaches , Significance of research, Research methods vs. methodology, Research process, Criteria of good research, Meaning of research problem, Sources of research problem, Errors in selecting a research problem, Scope and objectives of research problem, Effective literature studies approaches, Plagiarism, Research ethics, Problems encountered by researchers in India.	
II	**Concept and Importance in Research:** Features of a good research design, Exploratory research design, Concept types and uses, Descriptive research designs, Concept, Types and uses, Experimental design, Concept of independent & dependent variables, Interpretation , Meaning & technique, Precaution in interpretation , Significance of report writing; layout of the research report, Types of reports, Precautions for writing research reports, Effective technical writing, Role of computer software in report writing.	
III	**Data Collection:** Collection of primary data, Observation method, Interview method, Collection of data through questionnaires, Collection of data through schedules, Difference between questionnaires and schedules, Collection of secondary data.	**50**
IV	**Hypothesis**: Null hypothesis & alternative hypothesis, Basic concepts concerning testing of hypotheses, Procedure for hypothesis testing, Flow diagram for hypothesis testing, Qualities of a good hypothesis.	
V	**Nature of Intellectual Property:** Patents, Designs, Trade and copyright, Process of patenting and development, Technological research, Innovation, Patenting; Development, International scenario, International cooperation on intellectual property, Procedure for grants of patents, Patenting under PCT, patent rights**,** scope, licensing and transfer of technology, Patent information and databases, Geographical indications, New developments in IPR, Administration of patent system, IPR of biological systems.	

Text Book/References Books/ Websites:

1. C . R. Kothari; Research Methodology; New Age Publication.
2. Wayne Goddard and Stuart Melville; Research Methodology;An Introduction.
3. Ranjit Kumar; Research Methodology; A Step by Step Guide for beginners.
4. Robert P. Merges, Peter S. Menell; Mark A. Lemley; Intellectual Property in New Technological Age.
5. T. Ramappa; Intellectual Property Rights Under WTO ; S. Chand; 2008.

Suggested List of Laboratory Experiments :- (Expandable): Nil

School of Research and Technology   *Department: Electrical Engineering*

PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Bachelor of Technology**   **Semester –VI**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total	External (Nil)	Internal (50)	Total (50)
BT-1608	GD/Seminar	-	-	1			Nil			Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/Attendance Max. Marks: 50

Pre-Requisite	Nil
Course Outcome	1. Develop confidence and students should able to share their views publically.
	2. Understand and critique scientific presentations.

Unit	Contents (Theory)	Marks Weightage
	Objective of GD and seminar is to improve the Mass Communication and Convincing/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Effective power point presentation of scientific research of concern discipline where students will prepare, practice, and present short scientific seminars, and receive feedback from each other that will help us give even better presentations in the future. This effort will help them to communicate their ideas more clearly. Evaluation will be done by assigned faculty based on group discussion and power point presentation.	**50**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- (Expandable):

Students should prepare and submit hard and soft copy of their report to assigned faculty before End Sem Examination.

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